CCS Technical Documentation
RH-20 Series Transceivers

Service Software Instructions

Issue 1 10/2003
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Quick Guide for Phoenix Service SW Installation

Phoenix Installation Steps in Brief

DCT-4 generation Test and Service Software is called "Phoenix"

These are the basic steps to install the Phoenix

- Install the Phoenix Service SW
- Install the Data Package for Phoenix (product specific data and flash update package)
- Manage connection settings (depends on the tools you are using)
- Update FPS-8 SW (if you use FPS-8)
- Activate FPS-8
- Update JBV-1 Docking Station SW (only when needed)

The flash update files are delivered with then Phoenix Data Package so unless you want to use certain version of this package, separate installation package is not needed anymore. If you want to use it, it should be installed after connection management, before FPS-8 update.

Please refer to Service Manual and Technical Bulletins for more information concerning phone model specific service tools and equipment setup.

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Phoenix Service SW

Before Installation

- Check that a Dongle is attached to the parallel port of your computer.
- Download the installation package (e.g. ***phoenix_service_sw_a7_2003_9_2_3.exe***) to your computer (e.g. C:\TEMP)
- Close all other programs
- Run the application file (e.g. ***phoenix_service_sw_a7_2003_9_2_3.exe****)* and follow instructions on the screen
- Administrator rights may be required to be able to install Phoenix depending on the Operating System
- If the dongle driver is installed or updated, you need to reboot your PC before the installation can continue.
- If uninstalling or rebooting is needed at any point, you will be prompted by the Install Shield program.

If at any point during installation you get this message, Dongle is not found and installation can´t continue.

Possible reasons may be defective or too old PKD-1Dongle (five digit serial number Dongle when used with FPS-8 Prommer) or that the FLS-4S POS Flash Dongle is defective or power to it is not supplied by external charger.

Check the COM /parallel ports used first! After correcting the problem Installation can be restarted.

Dongle not found
Insert Nokia dongle and click Retry to re-detect the dongle or click Cancel to exit the installation.
Retry
Cancel

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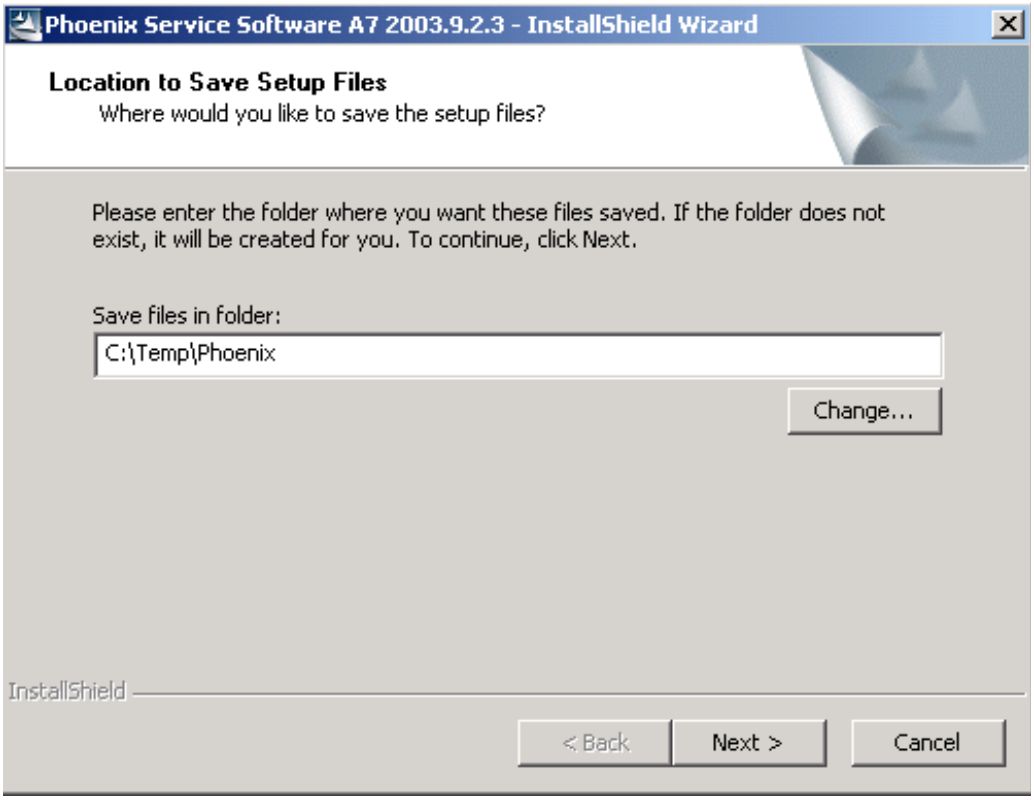
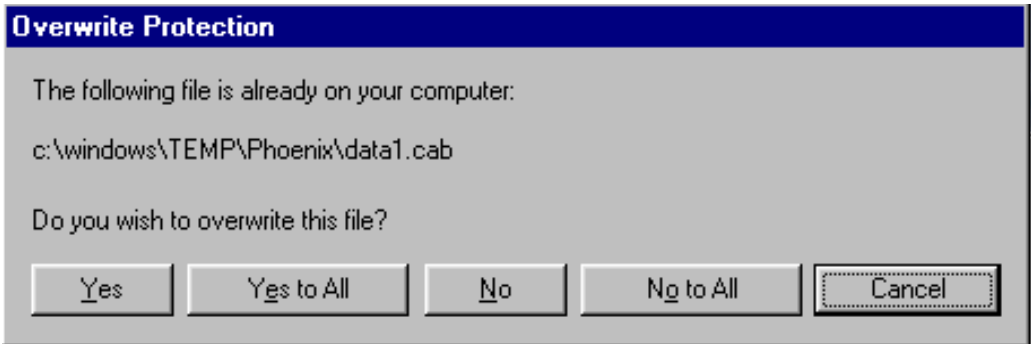
Startup

Run the ***phoenix_service_sw_a7_2003_9_2_3.exe*** to start installation.

When you choose "Next" the files needed for installation will be extracted. Kindly wait.


Phoenix Service Software A7 2003.9.2.3 - InstallShield Wizard
Location to Save Setup Files
Where would you like to save the setup files?
Please enter the folder where you want these files saved. If the folder does not exist, it will be created for you. To continue, click Next.
Save files in folder:
C:\Temp\Phoenix
Change...
InstallShield
< Back
Next >
Cancel

If the setup files are already extracted (left in the file system from previous installation) following dialog appears. Always click "Yes to All" to overwrite the existing setup files.



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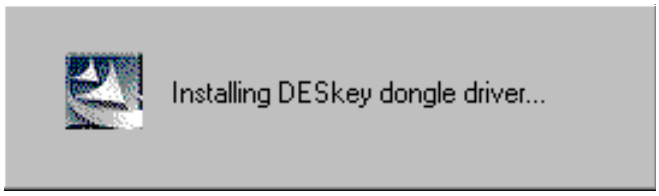
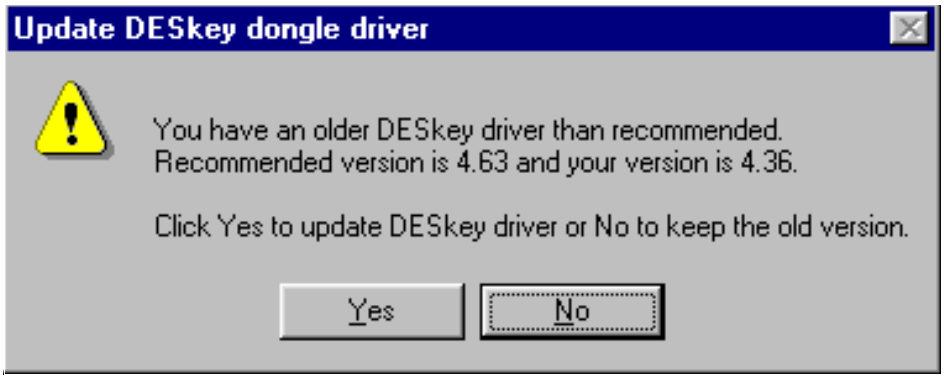
Dongle Driver Installation and Version Check

If there is no previously installed Dongle driver, installation will take place...

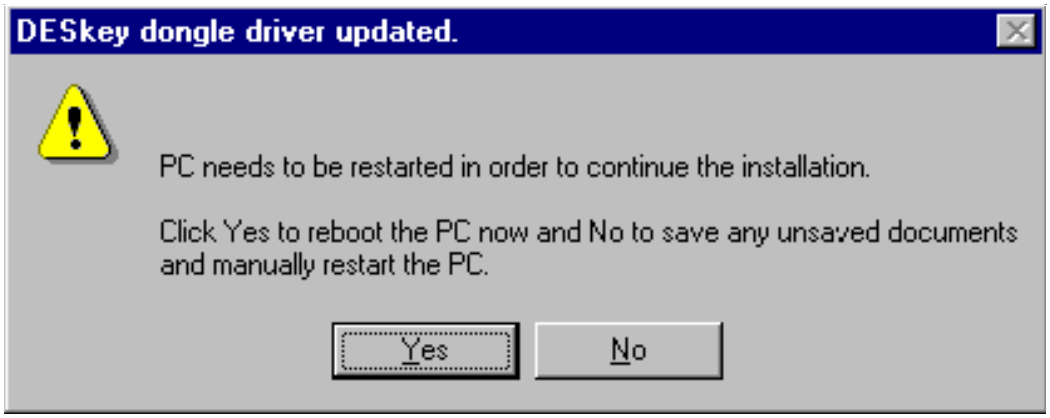


If the Dongle driver is installed and it is older than the latest supported version, the latest version will be installed when you choose "Yes". The latest version is always included in the latest Phoenix installation package.


Update DESkey dongle driver
You have an older DESkey driver than recommended.
Recommended version is 4.63 and your version is 4.36.
Click Yes to update DESkey driver or No to keep the old version.
Yes
No

PC needs to be rebooted before installation can continue. Click "Yes" to reboot the PC.

Setup is restarted automatically after reboot.


DESkey dongle driver updated.
PC needs to be restarted in order to continue the installation.
Click Yes to reboot the PC now and No to save any unsaved documents and manually restart the PC.
Yes
No

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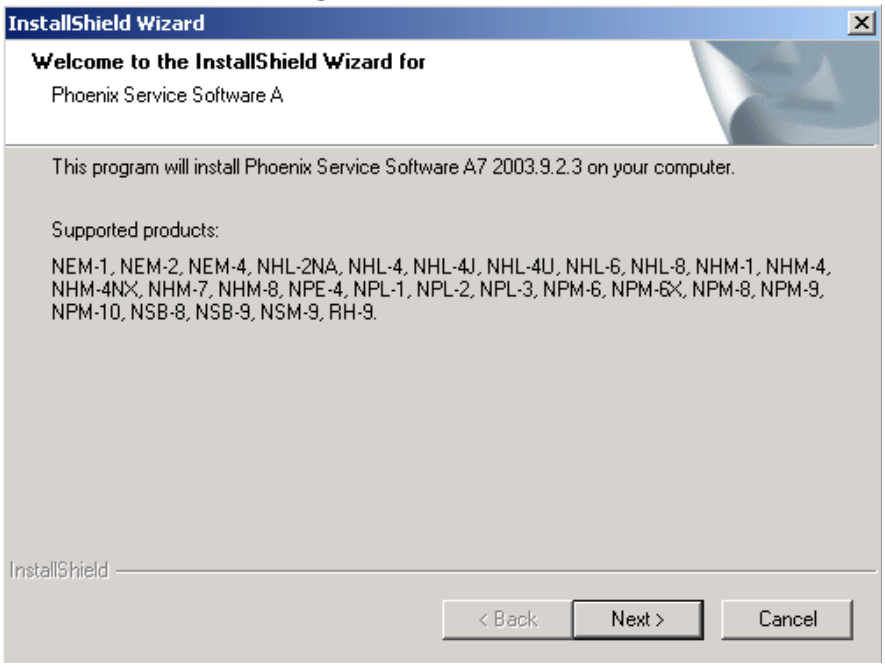
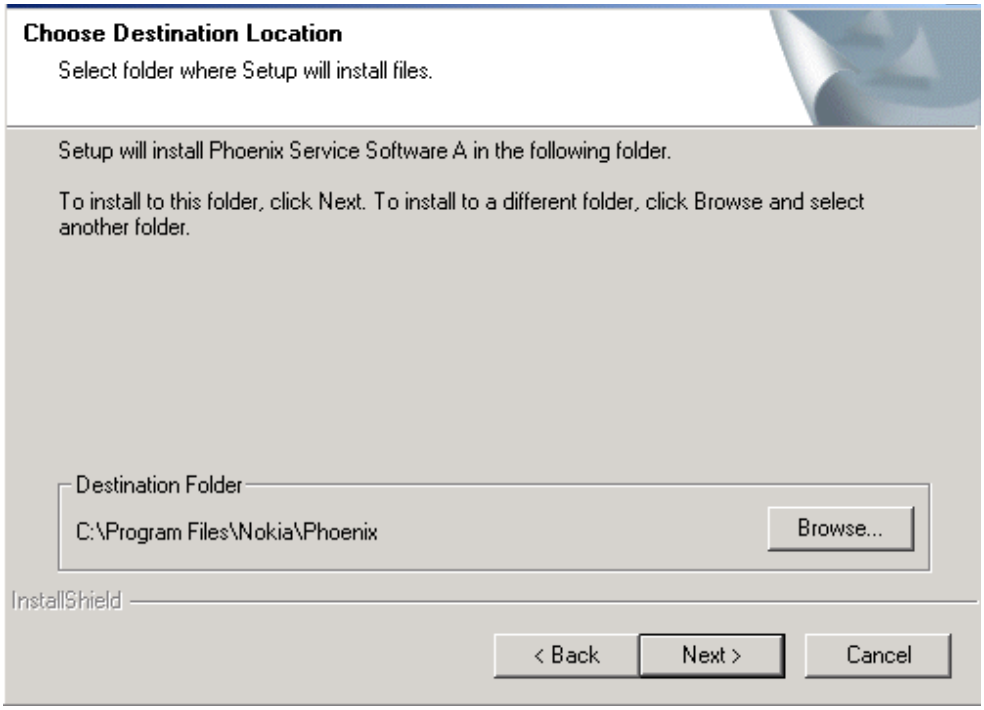
First Time Installation of Phoenix

After Dongle driver installation / update (if needed) installation continues from this step. Click "Next" in Welcome dialog to continue.


InstallShield Wizard
Welcome to the InstallShield Wizard for
Phoenix Service Software A
This program will install Phoenix Service Software A7 2003.9.2.3 on your computer.
Supported products:
NEM-1, NEM-2, NEM-4, NHL-2NA, NHL-4, NHL-4J, NHL-4U, NHL-6, NHL-8, NHM-1, NHM-4, NHM-4NX, NHM-7, NHM-8, NPE-4, NPL-1, NPL-2, NPL-3, NPM-6, NPM-6X, NPM-8, NPM-9, NPM-10, NSB-8, NSB-9, NSM-9, RH-9.
InstallShield
< Back
Next >
Cancel

Choose the destination folder, it is recommended to use the default folder ***C:\Program-Files\Nokia\Phoenix***.

Choose "Next" to continue. You may choose another location by selecting "Browse" (not recommended)


Choose Destination Location
Select folder where Setup will install files.
Setup will install Phoenix Service Software A in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\Program Files\Nokia\Phoenix
Browse...
InstallShield
< Back
Next >
Cancel

Setup copies the components, please wait.

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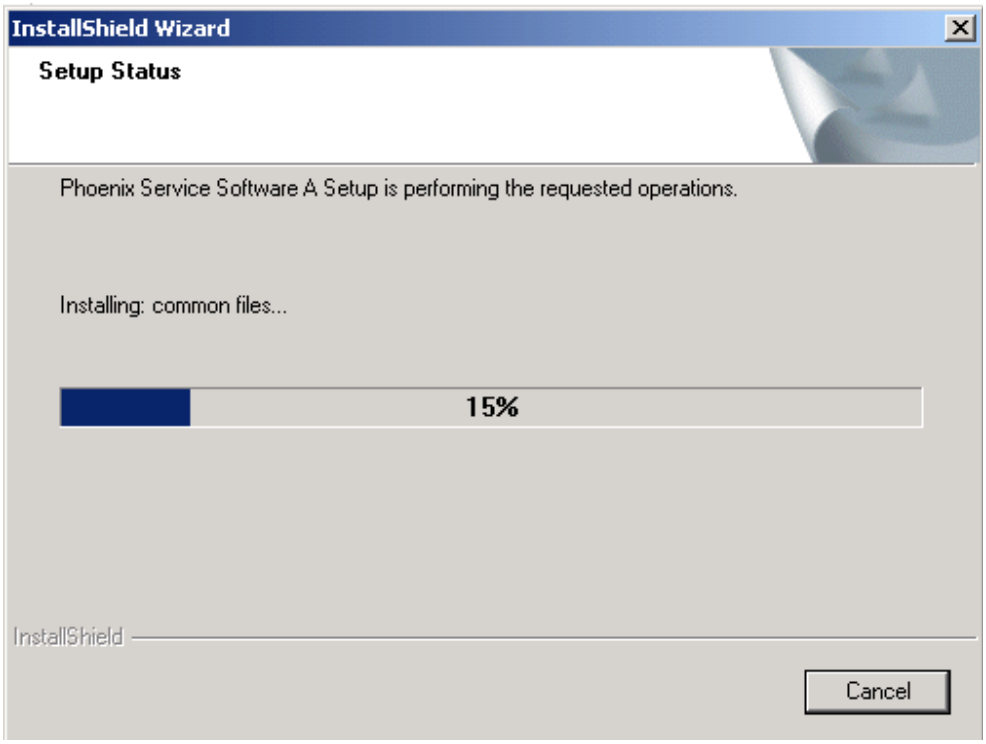
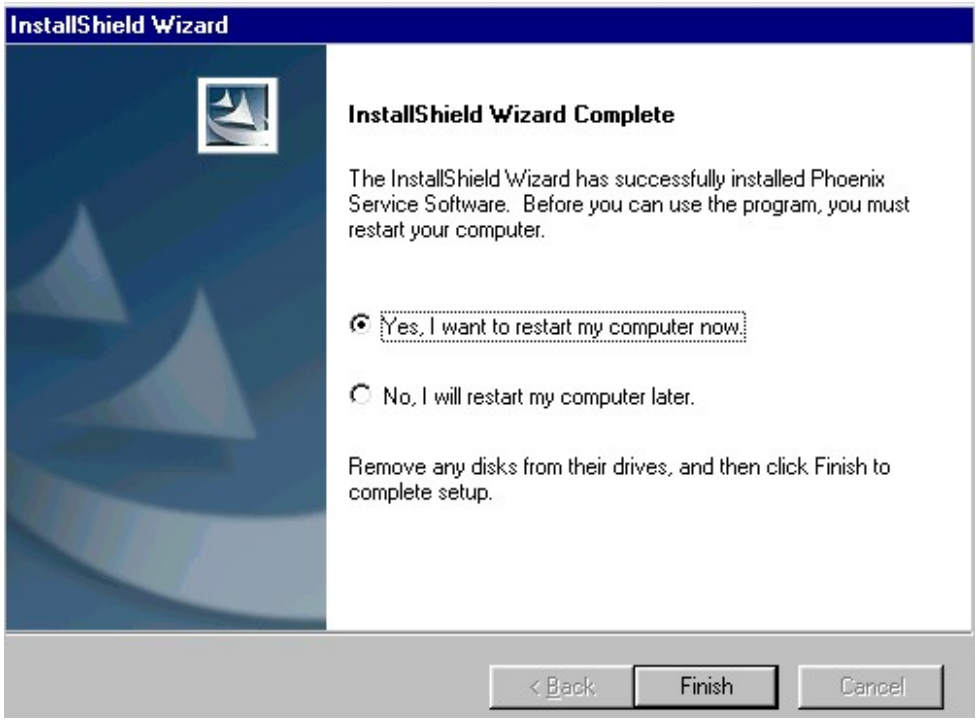
Progress of the setup is shown. Please wait...



If restarting of your computer is needed the Install Shield Wizard will tell you about it.

Select "Yes..." to reboot the PC immediatelly and "No..." to reboot the PC manually.

Note that Phoenix doesn't work, if components are not registered. Click "Finish" to continue.


InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Phoenix Service Software. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish
Cancel

After the reboot components are registered and Phoenix is ready for use.

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If reboot is not needed components are registered after copying them.

If restarting of your computer is not needed, Click "Finish" to exit the setup.

Phoenix is now ready for use.

Now the installation of Phoenix Service SW is ready and it can be used after:

- **Installing Phone model specific Phone Data Package for Phoenix**
- **Configuring the connections**
- **Updating the Flash Update Package files used with FPS-8* and FLS-4S* tools**

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Update Installation of Phoenix

If you already have the Phoenix Service SW installed on your computer, sooner or later there will be need to update it when new versions are released.

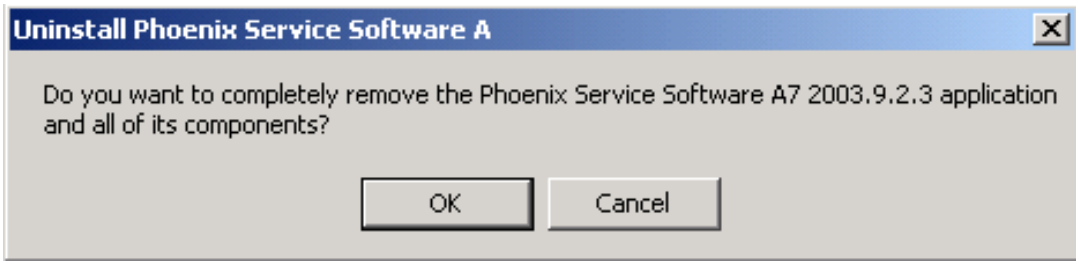
Please note that very often the Phoenix Service SW and the Phone Specific Data Package for Phoenix come in pairs, meaning that certain version of Phoenix can only be used with certain version of Data Package. Always use the latest available versions of both. Instructions can be found in phone model specific Technical Bulletins.

To update the Phoenix you need to take exactly the same steps as when installing it for the first time.

- Download the installation package to your computer hard disk
- Close all other programs
- Run the application file (e.g. ***phoenix_service_sw_a7_2003_9_2_3.exe***)
- Dongle driver version will be checked and if need be, updated
- After reboot installation starts automatically
- Newer version of Phoenix will be installed

When you update the Phoenix from old to new version (e.g. update from 2003_9_2_3 to 2003_9_2_5), the update will take place automatically without uninstallation

If you try update the Phoenix with the same version that you already have you are asked if you want to uninstall the version of Phoenix you have on your PC. Answer "OK" to uninstall Phoenix, "Cancel" if you don't want to uninstall.


Uninstall Phoenix Service Software A
Do you want to completely remove the Phoenix Service Software A7 2003.9.2.3 application and all of its components?
OK
Cancel

If you try to install an older version (e.g. downgrade from 2003_9_2_3 to 2003_9_1_2) installation will be interrupted.

Always follow the instructions on the screen.

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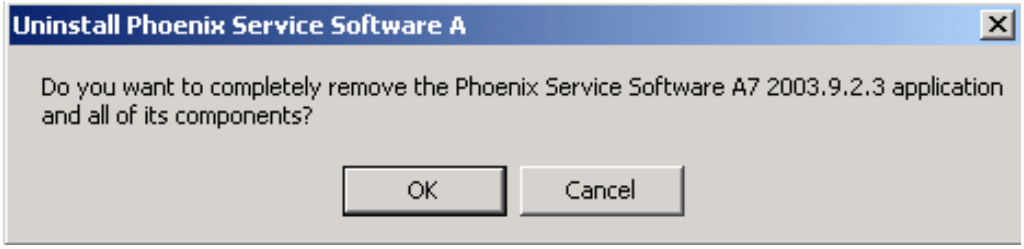
How to Uninstall Phoenix

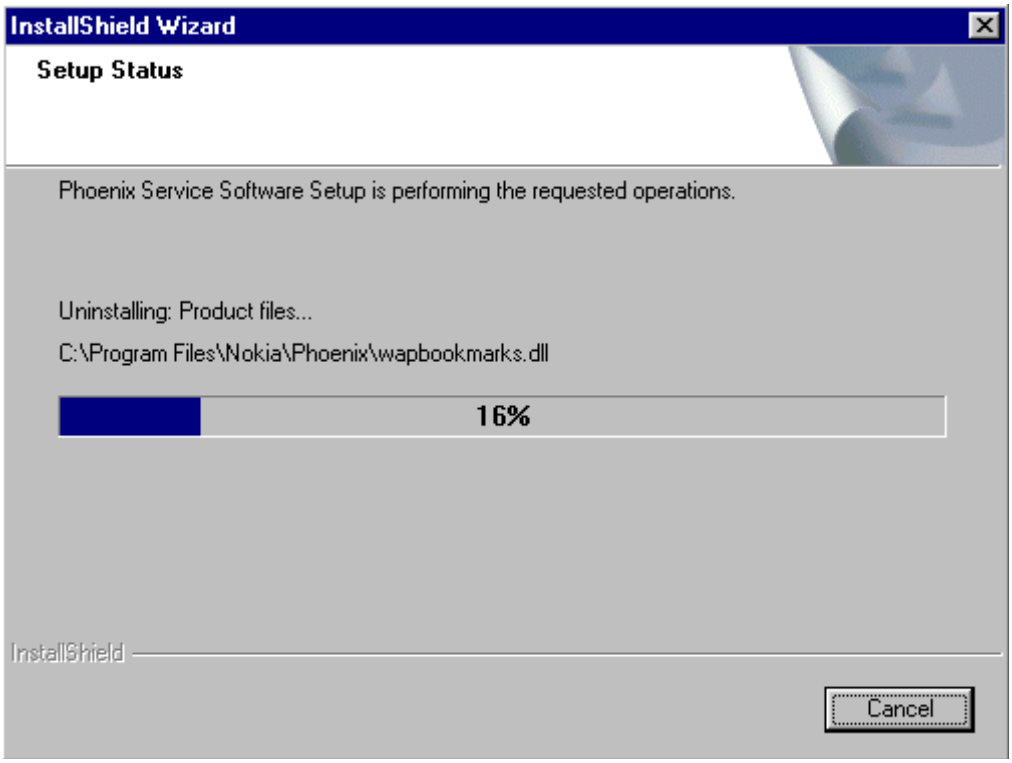
Uninstallation can be done manually from Windows Control Panel - Add / Remove Programs.

Choose "Phoenix Service Software" and click "Add/Remove".

Choose "OK" to uninstall


Uninstall Phoenix Service Software A
Do you want to completely remove the Phoenix Service Software A7 2003.9.2.3 application and all of its components?
OK
Cancel

Progress of the uninstallation is shown.



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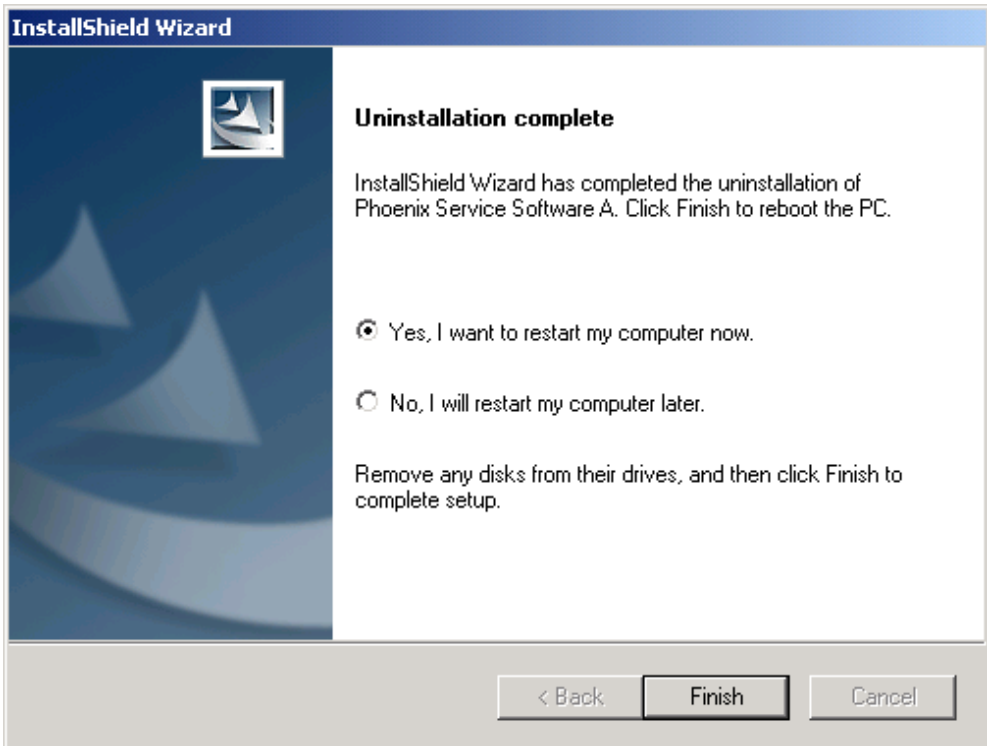
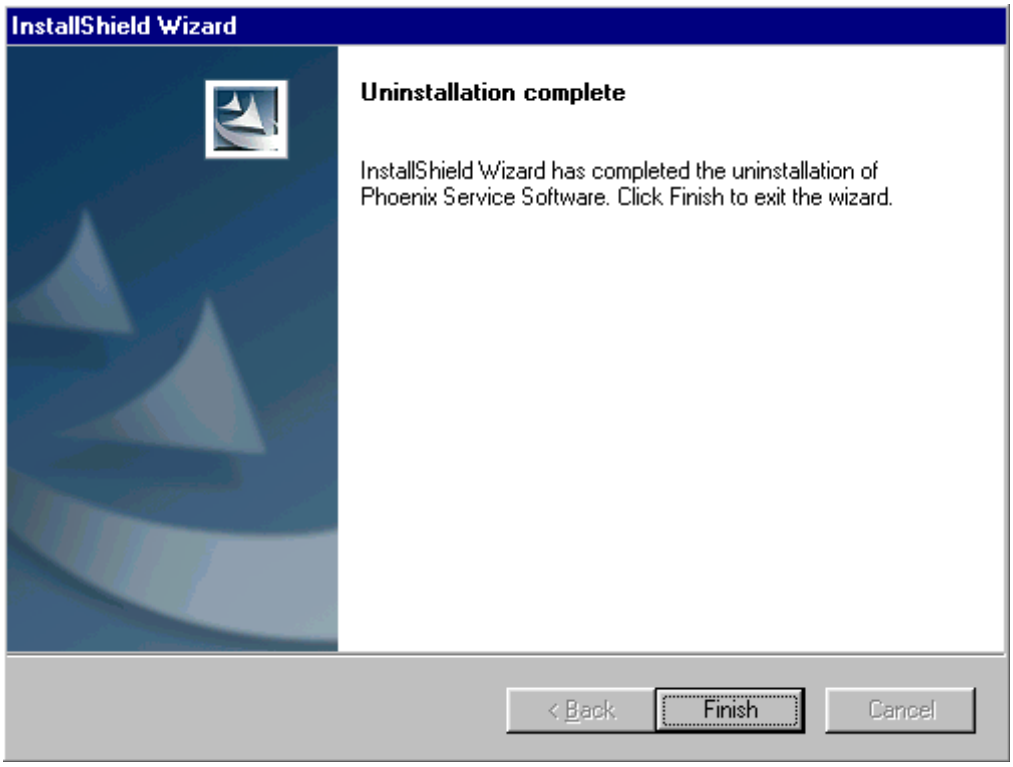
You may have to reboot the PC after uninstallation.


InstallShield Wizard
Uninstallation complete
InstallShield Wizard has completed the uninstallation of Phoenix Service Software A. Click Finish to reboot the PC.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish
Cancel

If restarting is not needed, the following dialog will appear:


InstallShield Wizard
Uninstallation complete
InstallShield Wizard has completed the uninstallation of Phoenix Service Software. Click Finish to exit the wizard.
< Back
Finish
Cancel

Note! If you have different product packages installed, components are uninstalled only if they are not included in other product packages.

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Data Package for Phoenix (Product Specific)

Before installation

Product Data Package contains all product specific data to make the Phoenix Service Software and tools usable with a certain phone model.

It also includes the latest version of flash update package for FLS-4S* and FPS-8*

- Check that the Dongle is attached to the parallel port of your computer.
- Install Phoenix Service SW
- Download the installation package (e.g. ***RH-20_dp_v1.0_sw3.02.exe***) to your computer (e.g. C:\TEMP)
- Close all other programs
- Run the application file (e.g.***RH-20_dp_v1.0_sw3.02.exe***) and follow instructions on the screen

If you already have the Phoenix Service SW installed on your computer, sooner or later there will be need to update it when new versions are released.

Please note that very often the Phoenix Service SW and the Phone Specific Data Package for Phoenix come in pairs, meaning that certain version of Phoenix can only be used with certain version of Data Package. Always use the latest available versions of both. Instructions can be found in phone model specific Technical Bulletins.

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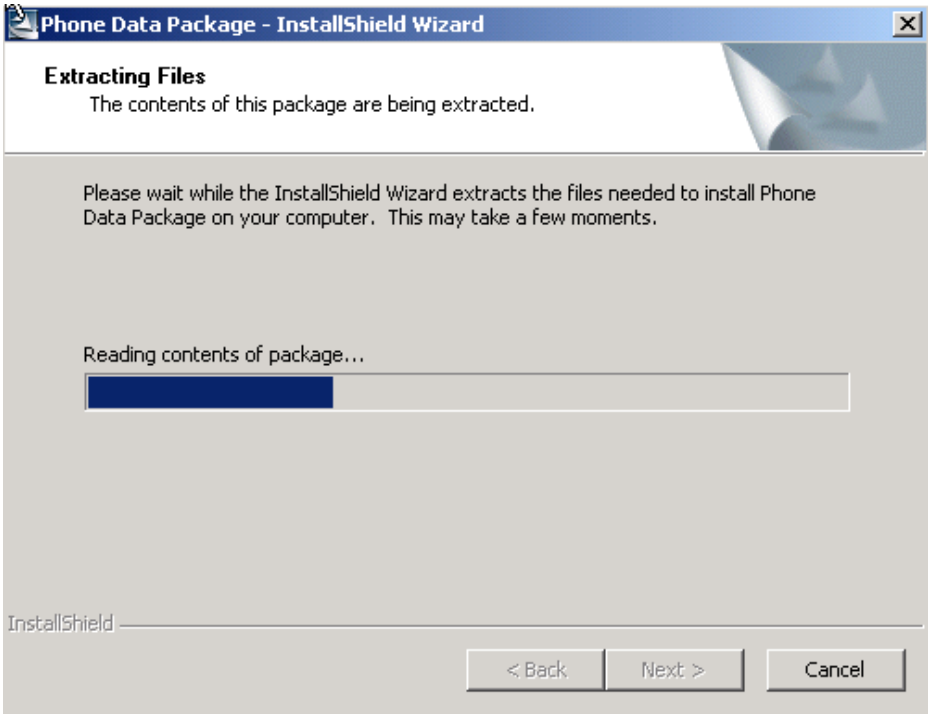
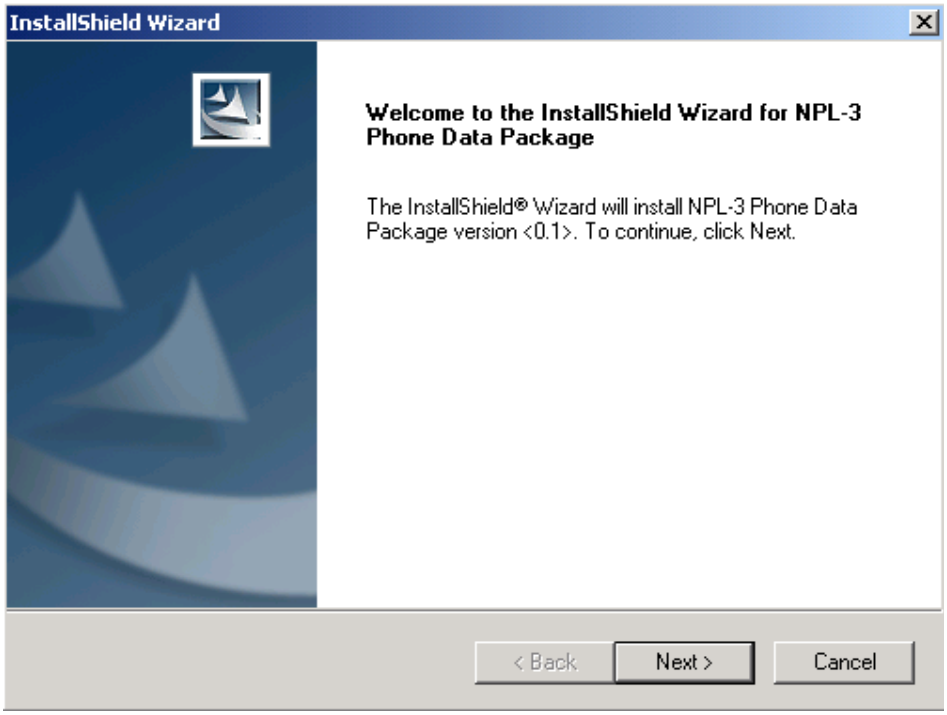
Installation of Phoenix Data Package (Product Specific)

Run the ***RH-20_dp_v1.0_sw3.02.exe*** to start installation.

When you choose "Next" the files needed for installation will be extracted. Please wait...


Phone Data Package - InstallShield Wizard
Extracting Files
The contents of this package are being extracted.
Please wait while the InstallShield Wizard extracts the files needed to install Phone Data Package on your computer. This may take a few moments.
Reading contents of package...
InstallShield
< Back
Next >
Cancel

Choose "Next" to continue.


InstallShield Wizard
Welcome to the InstallShield Wizard for NPL-3 Phone Data Package
The InstallShield® Wizard will install NPL-3 Phone Data Package version <0.1>. To continue, click Next.
< Back
Next >
Cancel

From this view you can see the contents of the Data Package.

Read the text carefully.

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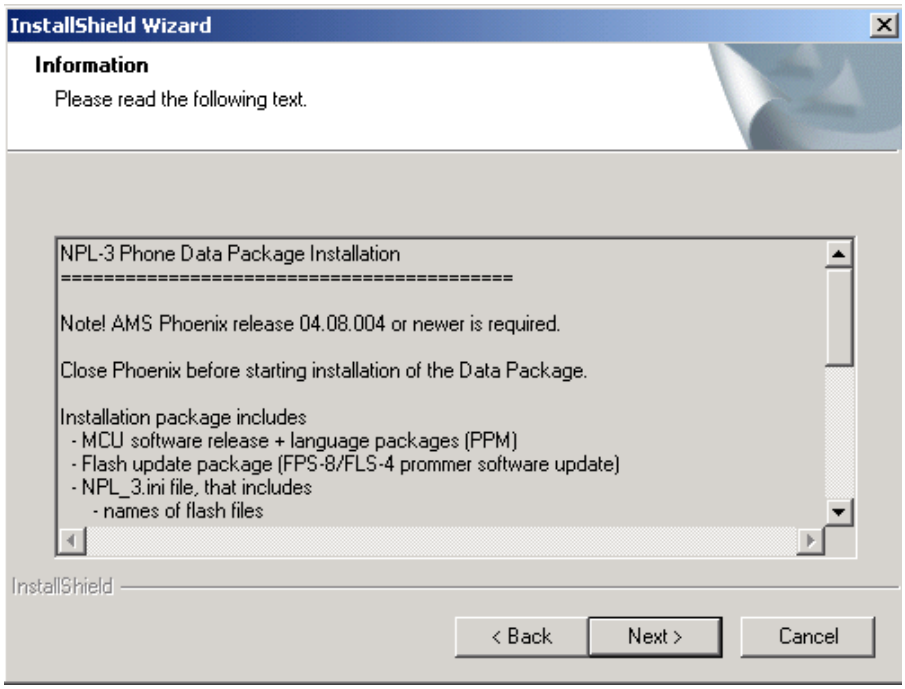
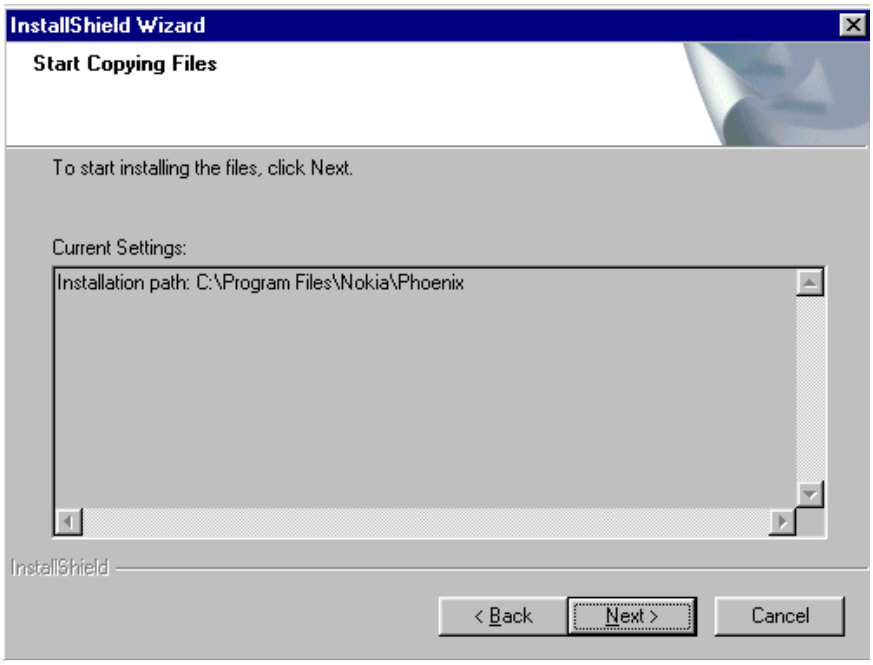
There should be information about the Phoenix version needed with this data package. Choose “Next”.


InstallShield Wizard
Information
Please read the following text.
NPL-3 Phone Data Package Installation
==========
Note! AMS Phoenix release 04.08.004 or newer is required.
Close Phoenix before starting installation of the Data Package.
Installation package includes
- MCU software release + language packages (PPM)
- Flash update package (FPS-8/FLS-4 prommer software update)
- NPL_3.ini file, that includes
- names of flash files
InstallShield
< Back
Next >
Cancel

Confirm location and choose “Next” to continue.

Install Shield checks where the Phoenix application is installed and the directory is shown. Choose “Next” to continue.



Phone model specific files will be installed... please wait.

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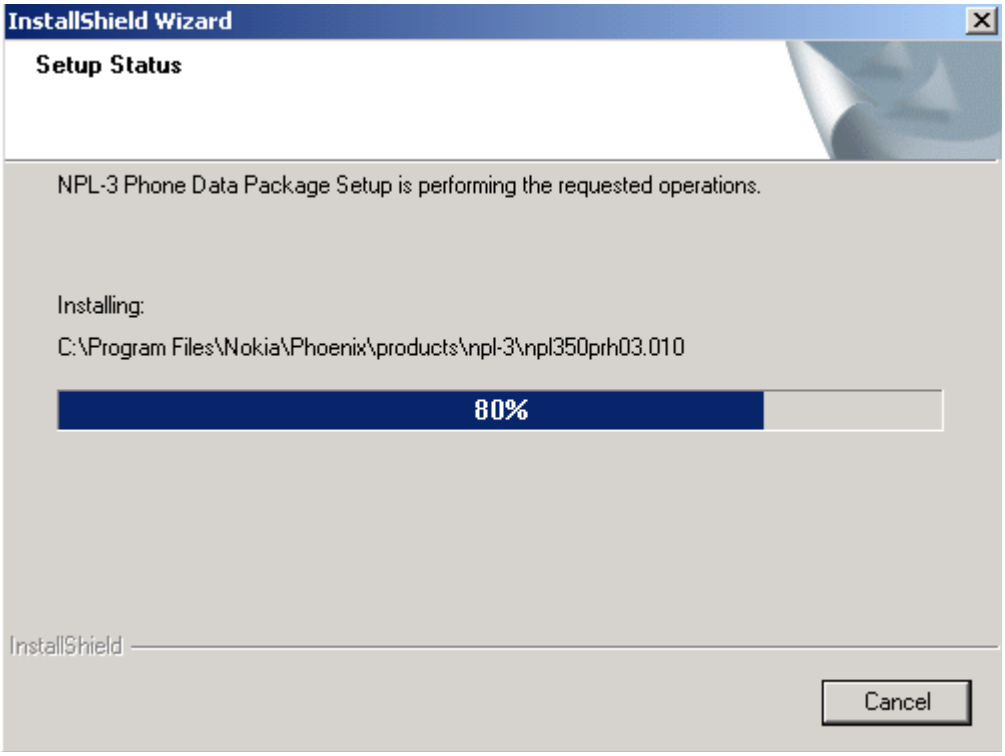
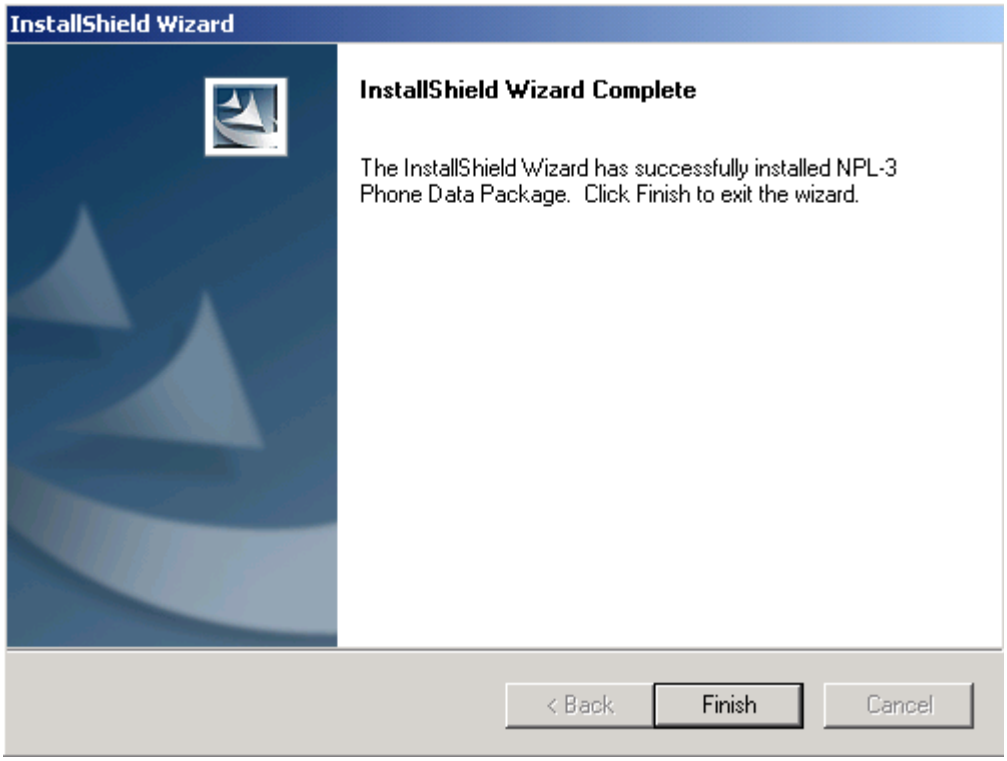


Choose "Finish" to complete installation.


InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed NPL-3 Phone Data Package. Click Finish to exit the wizard.
< Back
Finish
Cancel

You now have all phone model specific files installed in your Phoenix Service SW.

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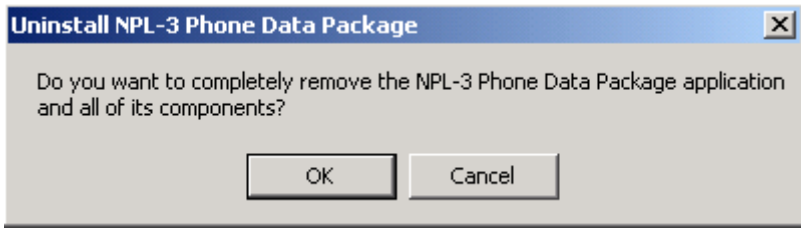
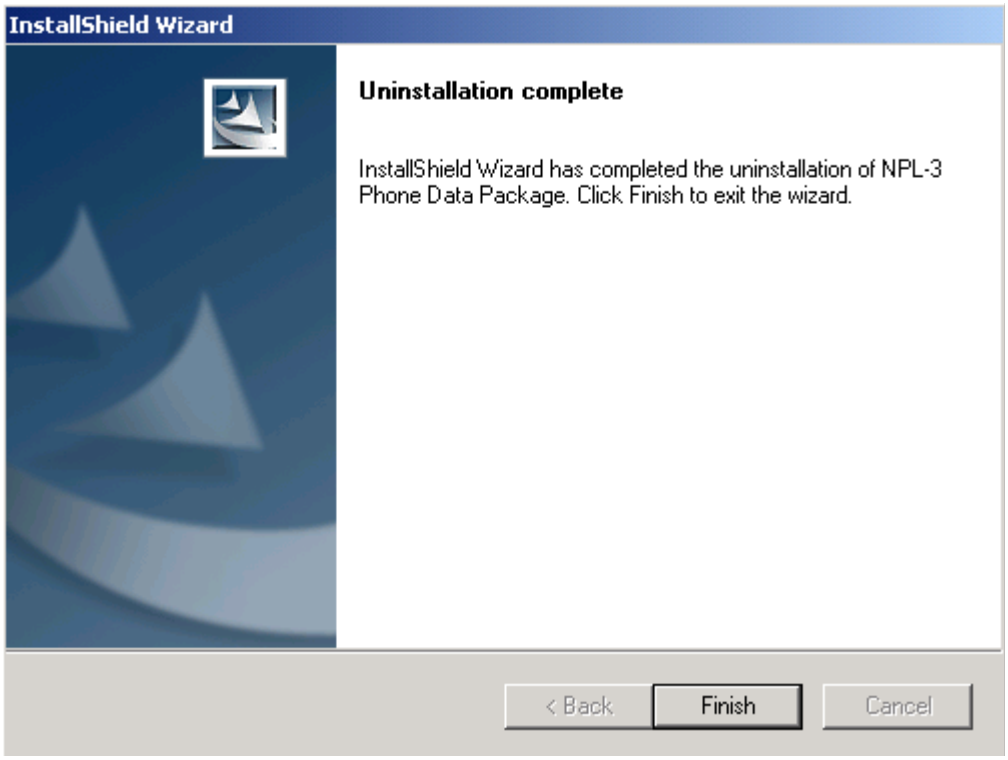
How to Uninstall Data Package

Uninstallation can also be done manually from Windows Control Panel / Add / Remove Programs/ “RH-20 Phone Data Package”.

If you try to install the same version of Phoenix Data Package that you already have, you are asked if you want to uninstall the version you have on your PC. Answer “OK” to uninstall, “Cancel” if you don’t want to uninstall. Older versions of data packages do not need to be uninstalled.


Uninstall NPL-3 Phone Data Package
Do you want to completely remove the NPL-3 Phone Data Package application and all of its components?
OK
Cancel

Once the previously installed Data package is uninstalled, choose “Finish”.


InstallShield Wizard
Uninstallation complete
InstallShield Wizard has completed the uninstallation of NPL-3 Phone Data Package. Click Finish to exit the wizard.
< Back
Finish
Cancel

Run the ***RH-20_dp_v1.0_sw3.02.exe*** again to continue installation from the beginning.

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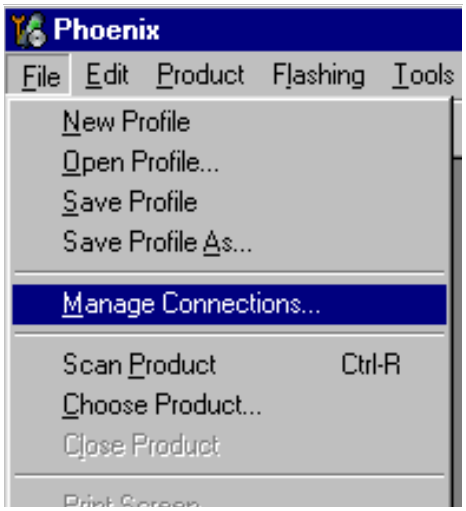
How to Manage Connections

Start Phoenix Service SW and Login.

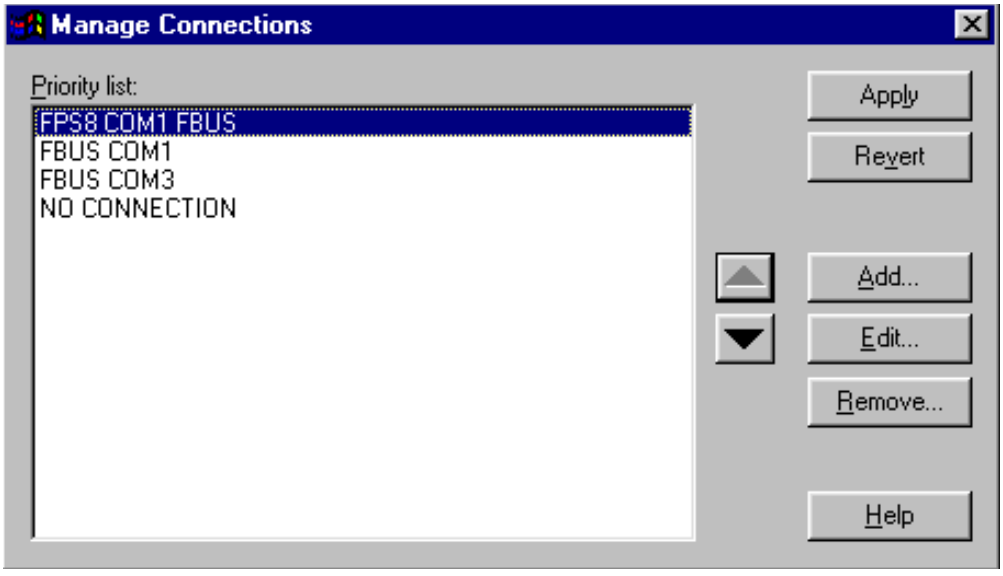
Choose "Manage Connections" From "File" – Menu



Existing connections can be selected, edited, deleted and new ones created by using this dialog.

A connection can be created either manually or by using a Connection Wizard.

To add new connection, choose "Add" and select if you want to create it manually or by using the Wizard.



Choose "Next" to continue.

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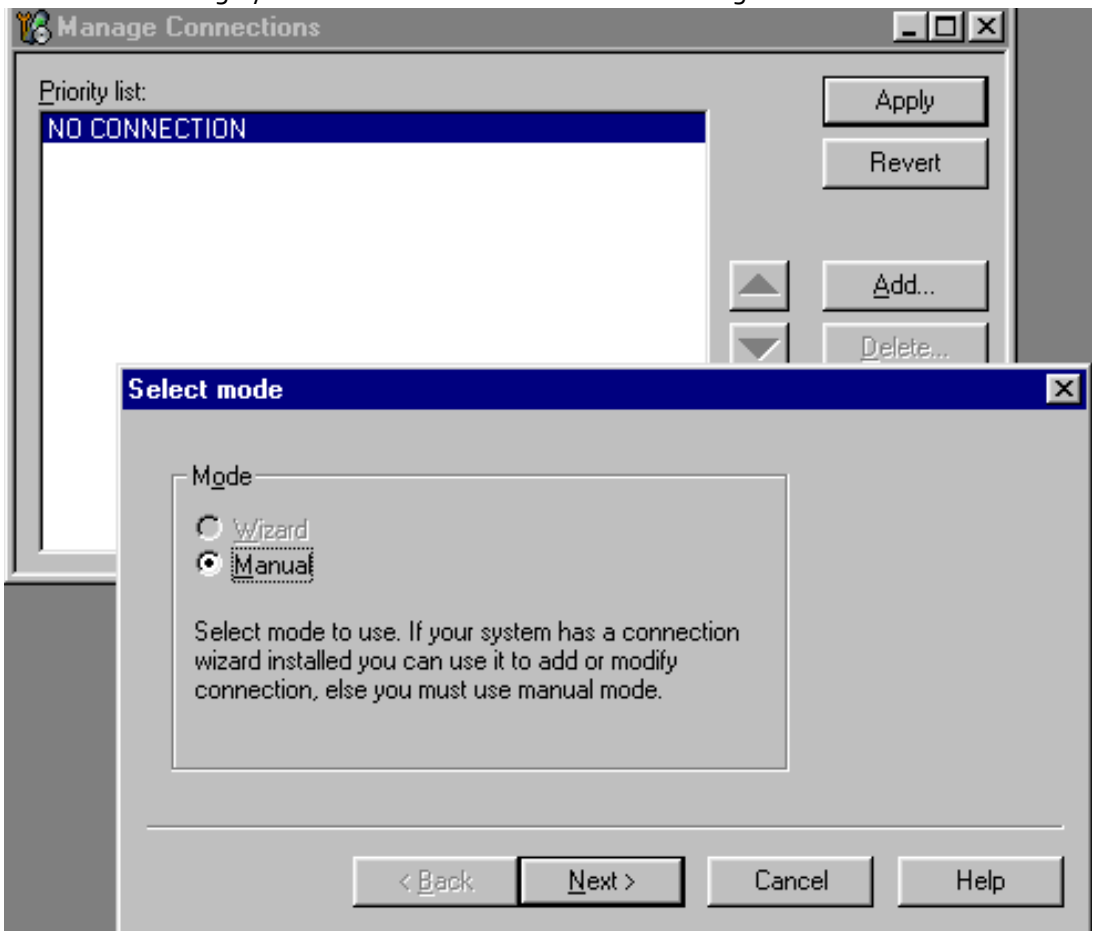
In the next dialogs you will be asked to select some settings for the connection



Manual Settings

A) For **FLS-4S POS Flash Device** choose following connection settings:

Media: FBUS

COM Port: Virtual COM Port used by FLS-4S. **Please check this always!**

(To check please go to Windows / Control Panel / FLS Virtual Port / Configuration)

B) For **FPS-8 Flash Prommer** choose following connection settings:

Media: FPS-8

Port Num: COM Port where FPS-8 is connected

COMBOX_DEF_MEDIA: FBUS

Choose "Finish" to complete.

If you use the Wizard, connect the tools and a phone to your PC and the wizard will automatically try to configure the correct connection.

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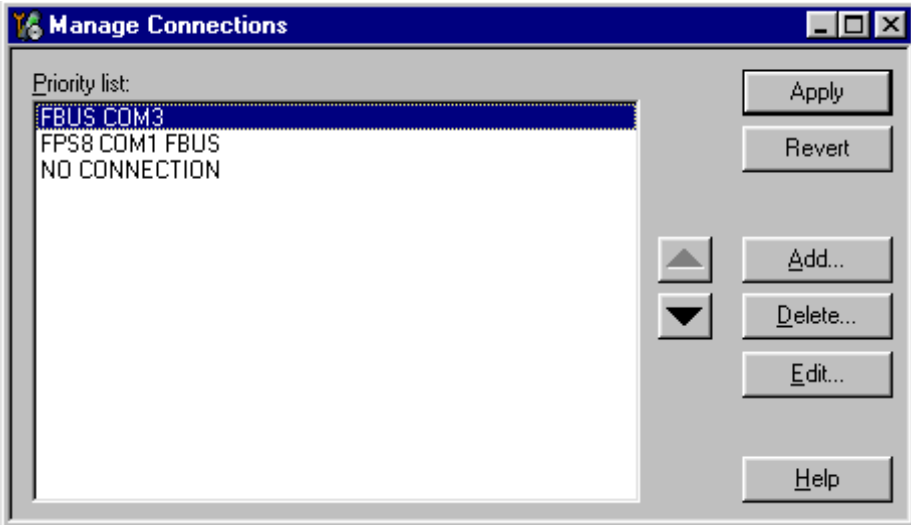
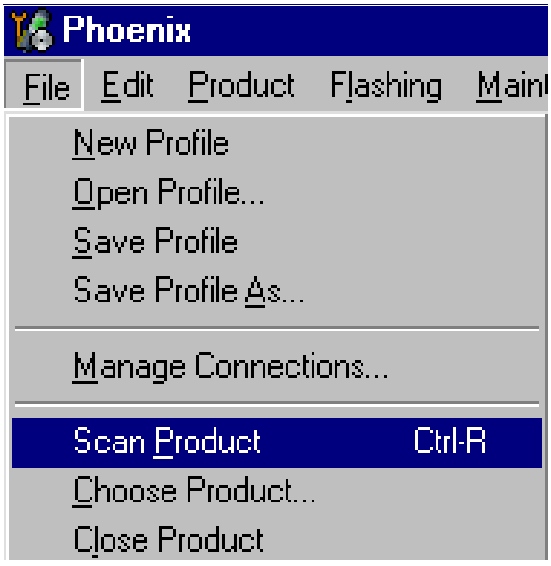
Activate the connection you want to use by clicking it and use up/down arrows to move it on top of the list. Choose "Apply".

The connection is now selected and can be used after closing the "Manage Connections" window.

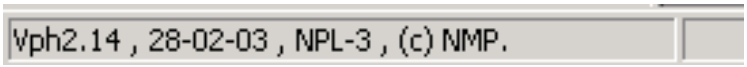


Selected connection will be shown on the right hand bottom corner of the screen.

To use the selected connection, connect the phone to Phoenix with correct service tools, make sure that it is switched on and select "Scan Product".



When the Product is found, Phoenix will load product support and when everything is ready, name of the loaded product support module and its version will be shown on the bottom of the screen.



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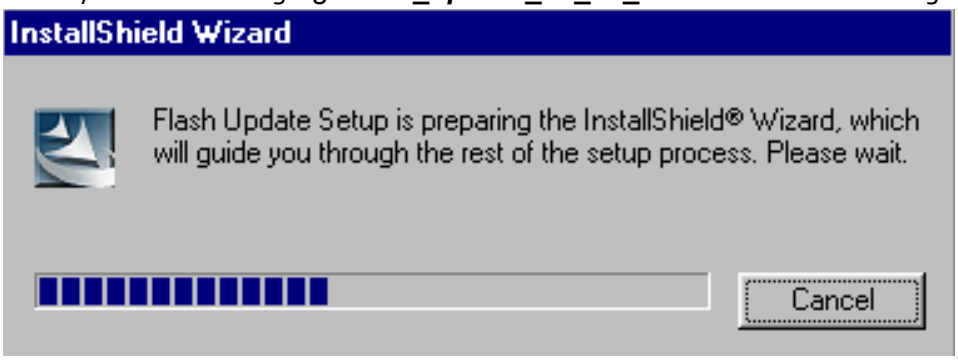
How to Update Flash Support Files for FPS-8* and FLS-4S*

Before Installation

- Install Phoenix Service SW and Phoenix data package.
- Install the phone model Specific Datapackage for Phoenix
- The flash support files are delivered in the same installation package with Phoenix data package.
- Normally it is enough to install the data package only before updating the FPS-8.
- Separate installation package is for flash support files are available, and the files can be updated according to this instruction.

Installing the Flash Support Files

Start by double clicking eg. ***flash_update_02_10_00.exe.*** Installation begins.


InstallShield Wizard
Flash Update Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

If you already have the same Flash Update package files installed, you need to confirm if you want them to be reinstalled.

Uninstall Flash Update
Do you want to completely remove the Flash Update 02.10.000 application and all of its components?
OK
Cancel

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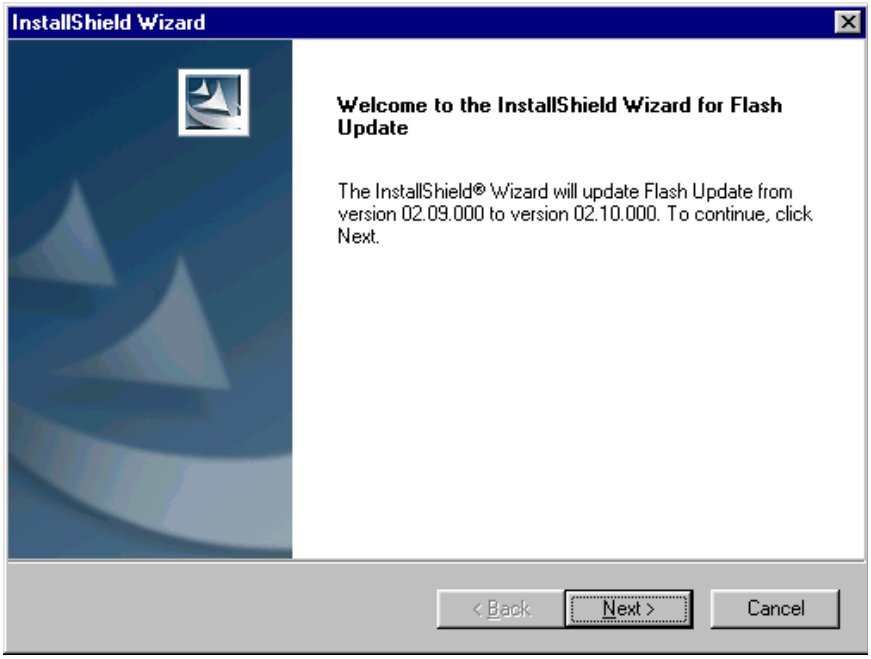
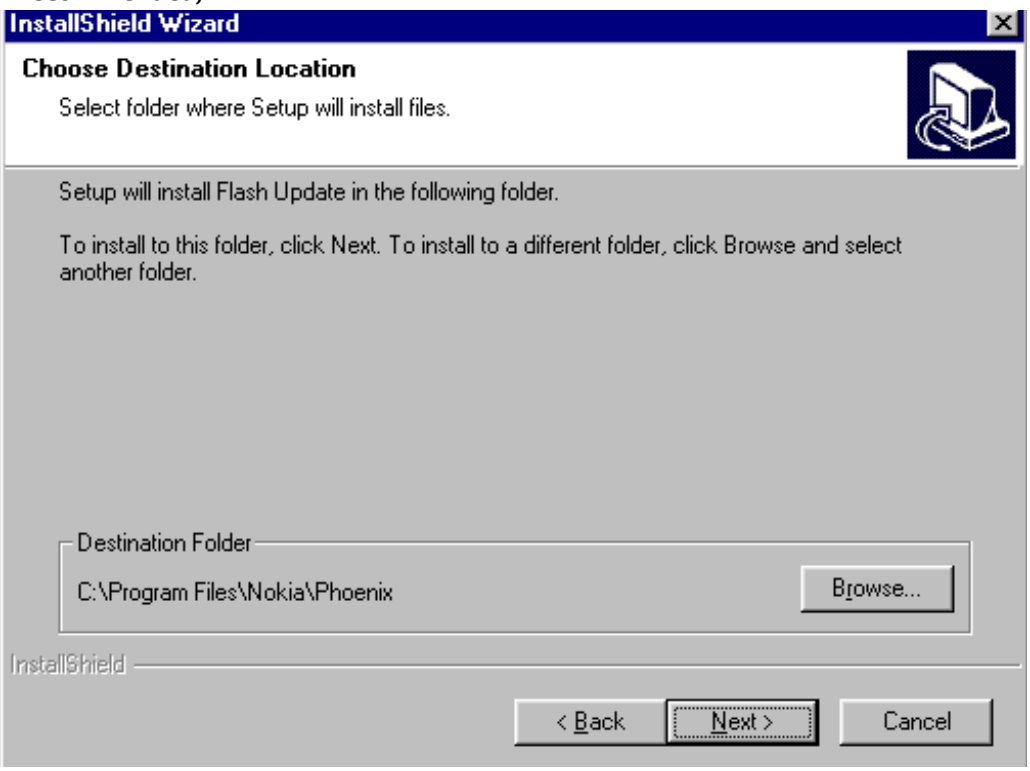
Choose "Next" to continue installation


InstallShield Wizard
Welcome to the InstallShield Wizard for Flash Update
The InstallShield® Wizard will update Flash Update from version 02.09.000 to version 02.10.000. To continue, click Next.
< Back
Next >
Cancel

It is **highly** recommended to install the files to the default destination folder ***C:|Program Files|Nokia|Phoenix***.

Choose "Next" to continue. You may choose another location by selecting "Browse" (not recommended).


InstallShield Wizard
Choose Destination Location
Select folder where Setup will install files.
Setup will install Flash Update in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\Program Files\Nokia\Phoenix
Browse...
InstallShield
< Back
Next >
Cancel

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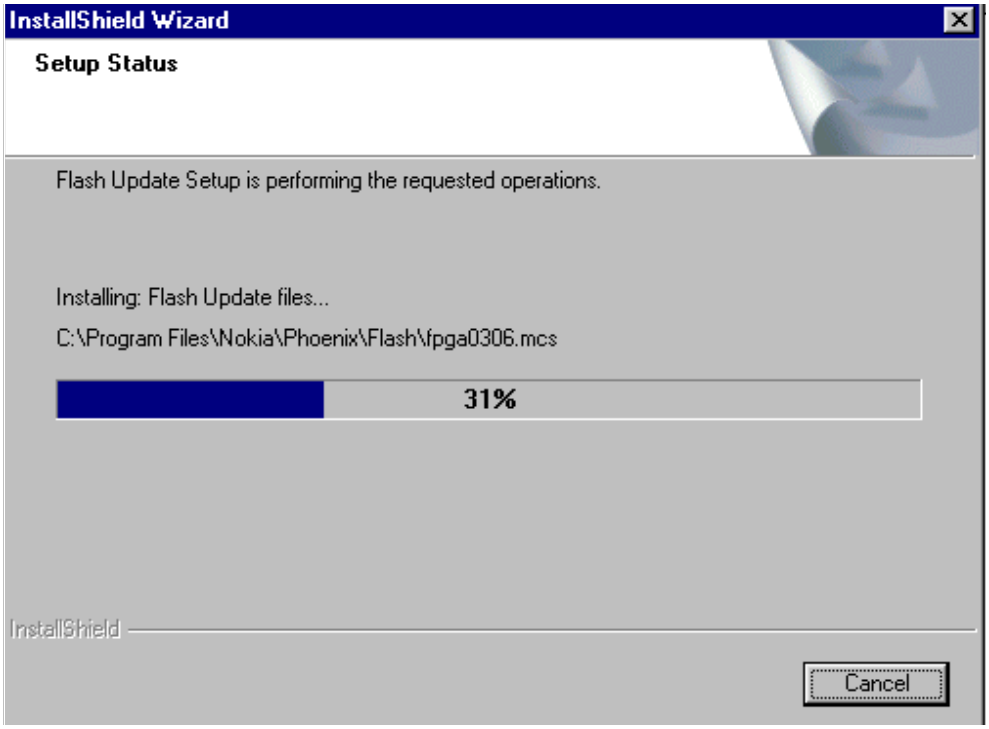
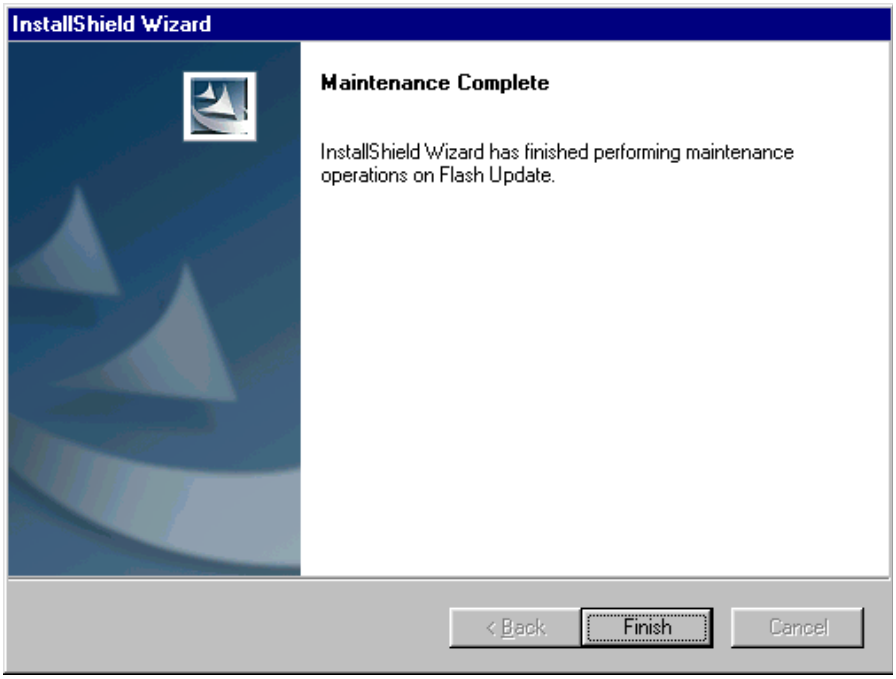
Installation continues...



Choose "Finish" to complete procedure.

- **FLS-4S can be used right after Flash Update Package is installed.**
- **FPS-8* must be updated by using Phoenix!**



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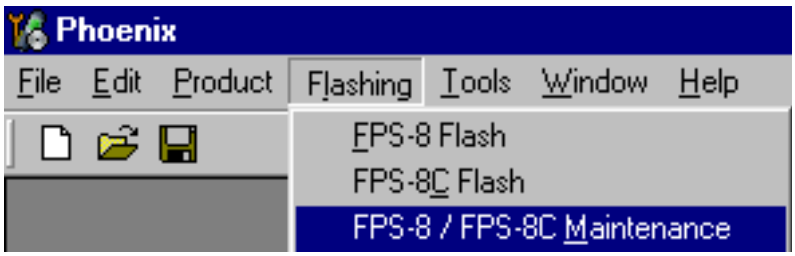
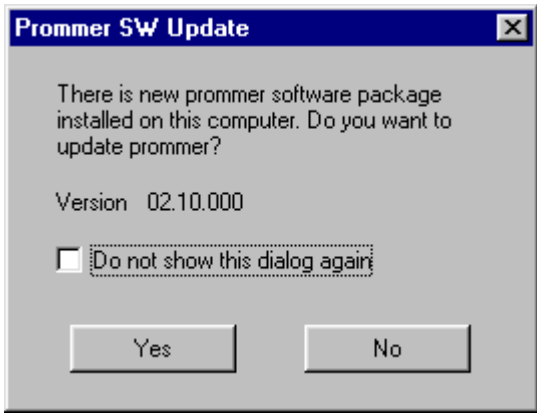
How to Update The FPS-8* Flash Prommer SW

Start Phoenix Service Software

Select"FPS-8 / FPS-8C maintenance" from"Flashing" menu.



When new FPS-8 flash update package is installed to computer you will be asked to update the files to your FPS-8 Prommer. Select"Yes" to update files..


Prommer SW Update
There is new prommer software package installed on this computer. Do you want to update prommer?
Version 02.10.000
Do not show this dialog again
Yes
No

Update procedure takes a couple of minutes.

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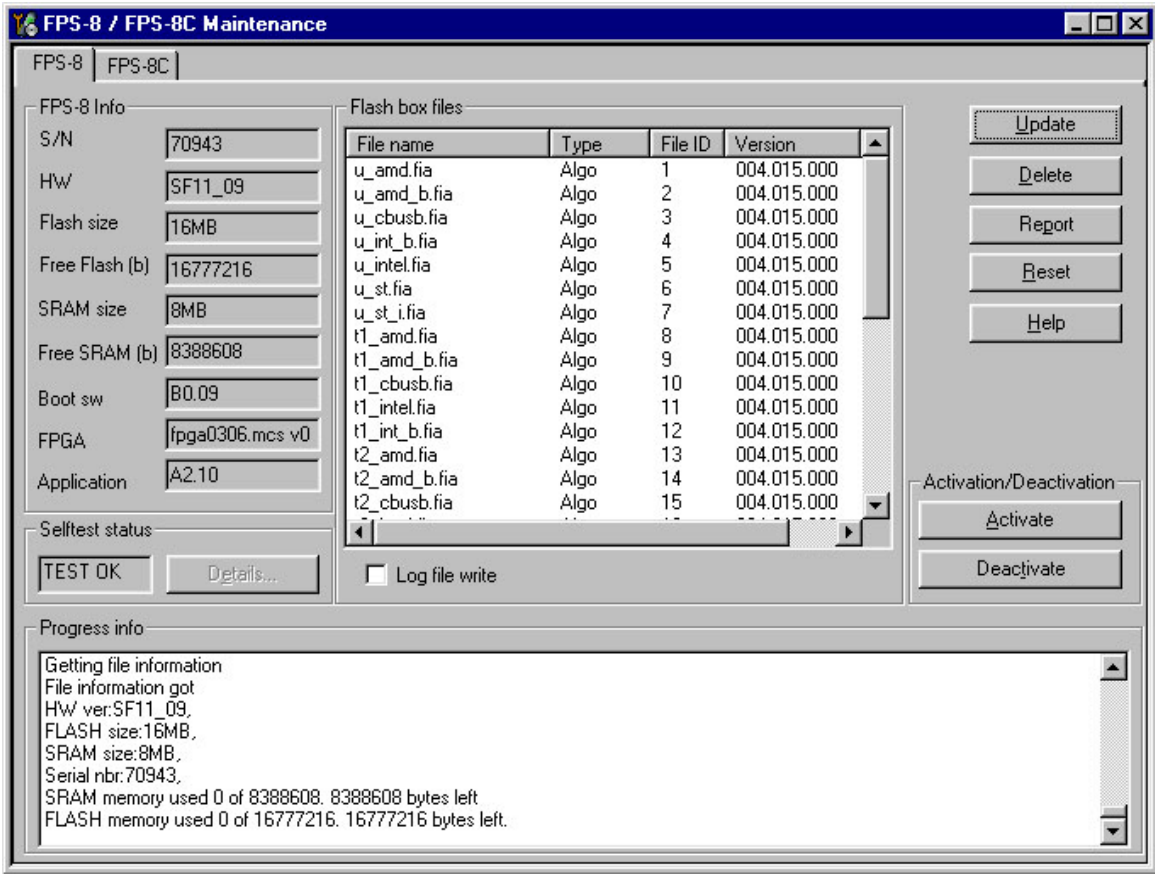
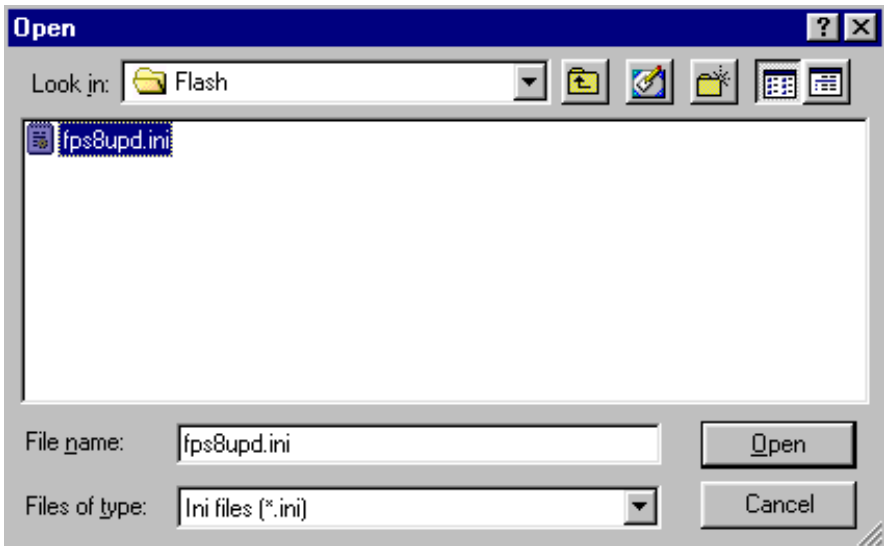


FPS-8 sw can also be updated by pressing"Update" button and selecting appropriate **fps8upd.ini** file under ***C:\Program Files\Nokia\Phoenix*\Flash** - directory



All files can be loaded separately to FPS-8. To do this, just press right mouse button in Flash box files" window and select file type to be loaded.

More information and help can be found from the "Help" dialog.

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FPS-8 Activation and Deactivation

- Before the FPS-8 can be successfully used for phone programming, it must be first activated.
- If there is a need to send FPS-8 box to somewhere e.g. for repair, box must be first deactivated.

Activation

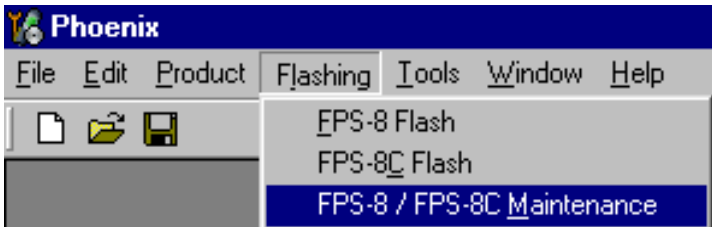
Before FPS-8 can be successfully used for phone programming, it must be first activated.

Fill in first "FPS-8 activation request" sheet, in the FPS-8 sales package and follow the instructions in the sheet.

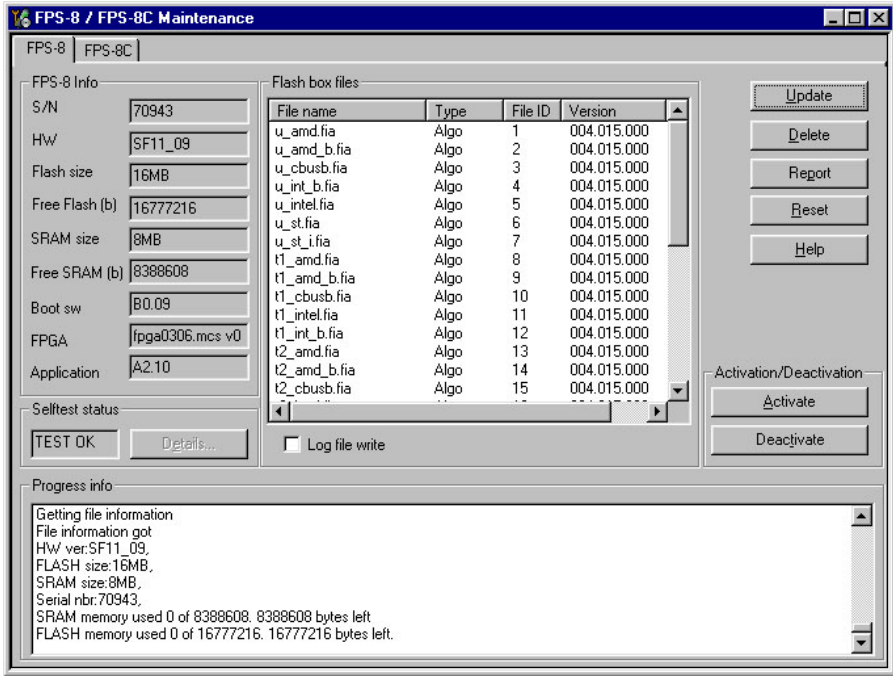
When activation file is received (e.g. 00000.in), copy it to ***C:\Program-Files\Nokia\Phoenix\BoxActivation -*** Directory on your computer (This directory is created when Phoenix is installed).

Start Phoenix Service Software.

Select "FPS-8 / FPS-8C maintenance" from "Flashing" menu.



Select "Activate" from the "FPS8/8C Maintenance" – UI.



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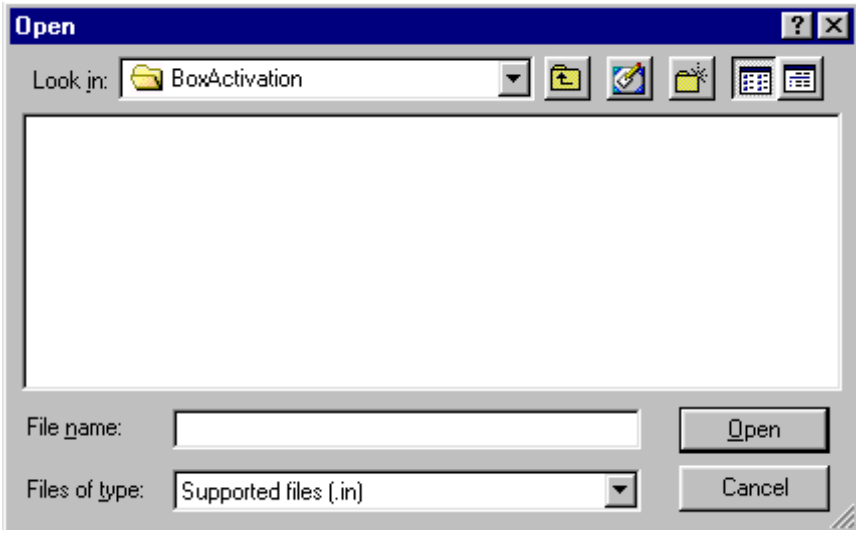
The activation file you saved to *C:\ProgramFiles\Nokia\Phoenix\BoxActivation* - directory will be shown (e.g. 00000.in), check that it is correct.



Box will be activated when you choose "Open".

Turn FPS-8 power off and on to complete activation.

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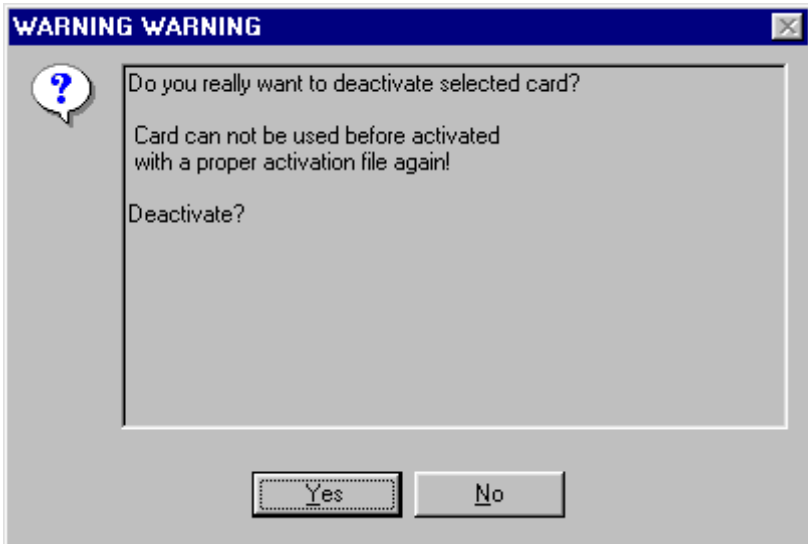
Deactivation

Start Phoenix Service Software.

Select "FPS-8 / FPS-8C maintenance" from "Flashing" menu.

Select "Deactivate" from the "FPS8/8C Maintenance" – UI.

Confirm Deactivation by choosing "Yes", Box will be deactivated.



Turn FPS-8 power off and on to complete deactivation.

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JBV-1 Docking Station SW

The JBV-1 Docking Station is a common tool for all DCT-4 generation products. In order to make the JBV-1 usable with different phone models, a phone specific Docking Station Adapter is used for different service functions.

The JBV-1 Docking Station contains Software (Firmware) which can be updated.

You need the following equipment to be able to update JBV-1 software:

- PC with USB connection
- Operating System supporting USB (Not Win 95 or NT)
- USB Cable (Can be purchased from shops or suppliers providing PC hardware and accessories)
- JBV-1 Docking Station
- External Power Supply 11-16V

Before Installation

- Download *Jbv1_update.zip* – file to your computer (e.g. C:\TEMP) from your download web site.
- Close all other programs
- Follow instructions on the screen

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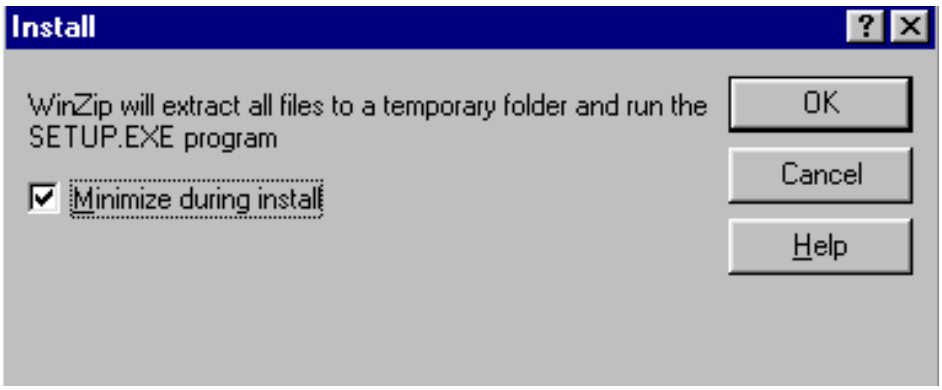
Installing SW Needed for the JBV-1 SW Update

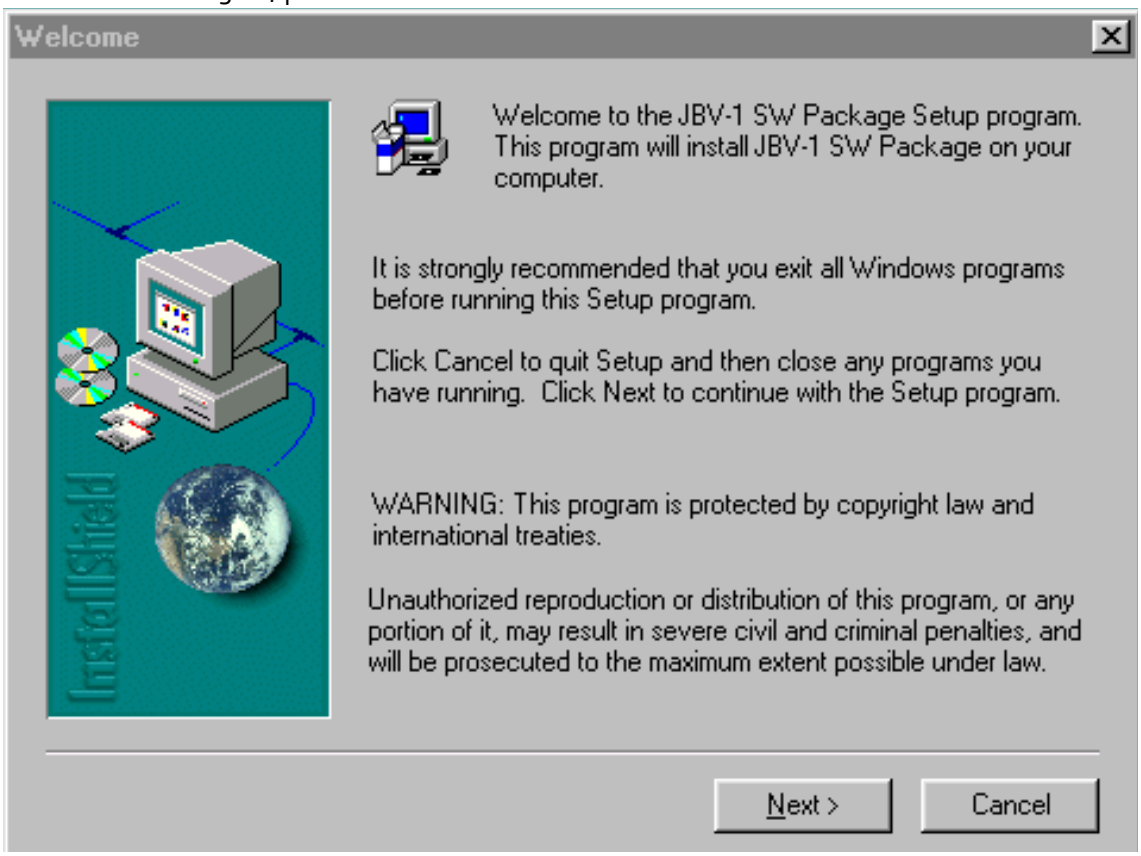
Note: DO NOT CONNECT THE USB CABLE / JBV-1 TO YOUR COMPUTER YET!

Run ***Jbv1_update.zip*** file and start SW Installation by double clicking ***Setup.exe***.

Files needed for JBV-1 Package setup Program will be extracted.



Installation begins, please read the information shown and Choose "Next" to continue.


Welcome
Welcome to the JBV-1 SW Package Setup program. This program will install JBV-1 SW Package on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
InstallShield
Next >
Cancel

Use suggested destination folder where JBV-1 SW Package will be installed and choose

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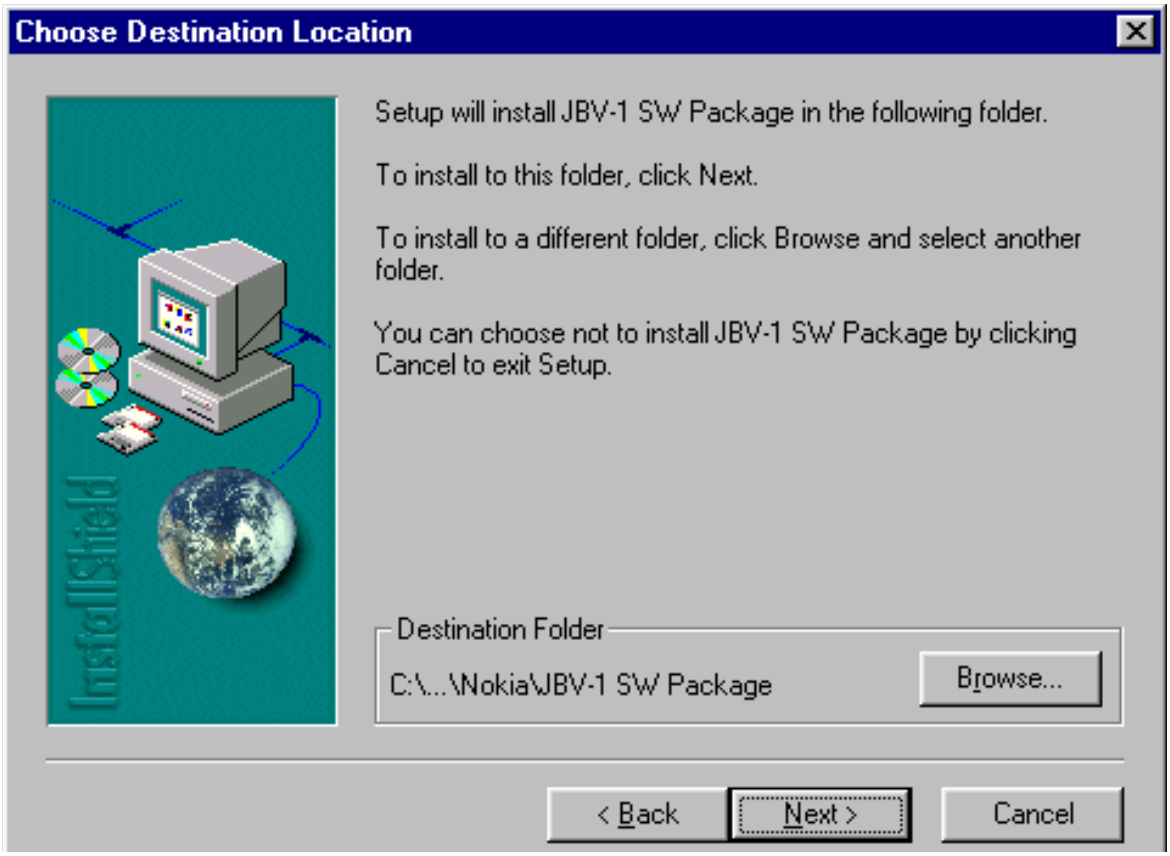
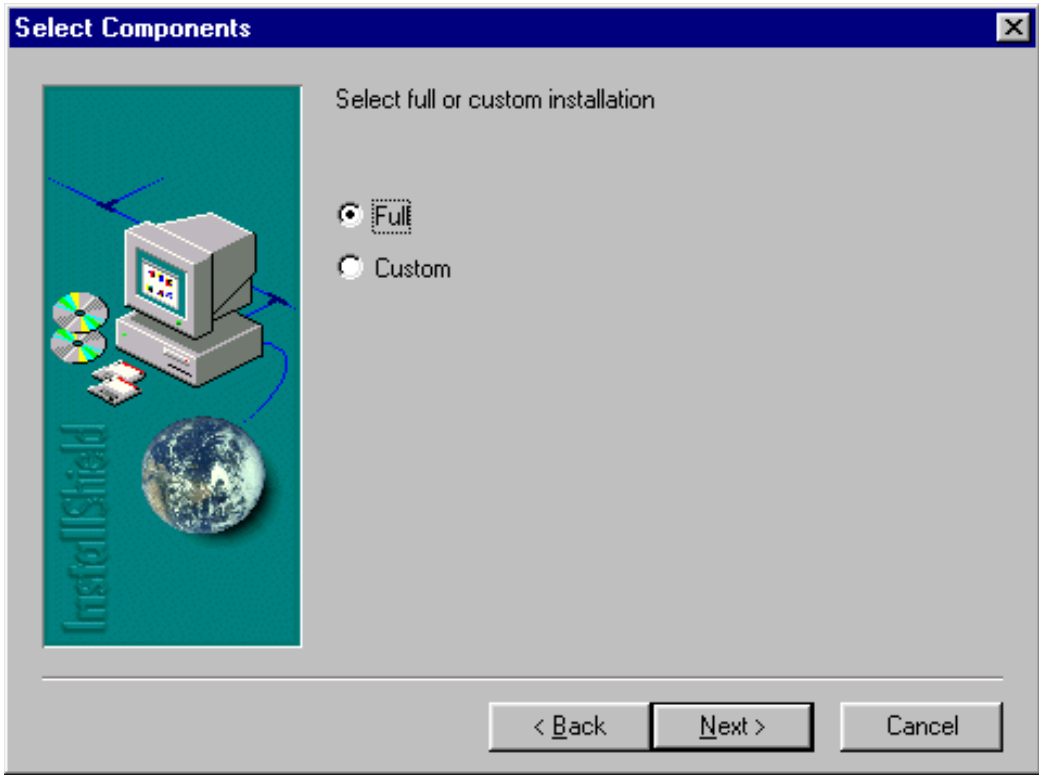
"Next" to continue.


Choose Destination Location
Setup will install JBV-1 SW Package in the following folder.
To install to this folder, click Next.
To install to a different folder, click Browse and select another folder.
You can choose not to install JBV-1 SW Package by clicking Cancel to exit Setup.
Destination Folder
C:\...\Nokia\JBV-1 SW Package
Browse...
< Back
Next >
Cancel
InstallShield

Select "Full" Installation and choose "Next" to continue



Program Folder will be created. Choose "Next" to continue, Software files will be

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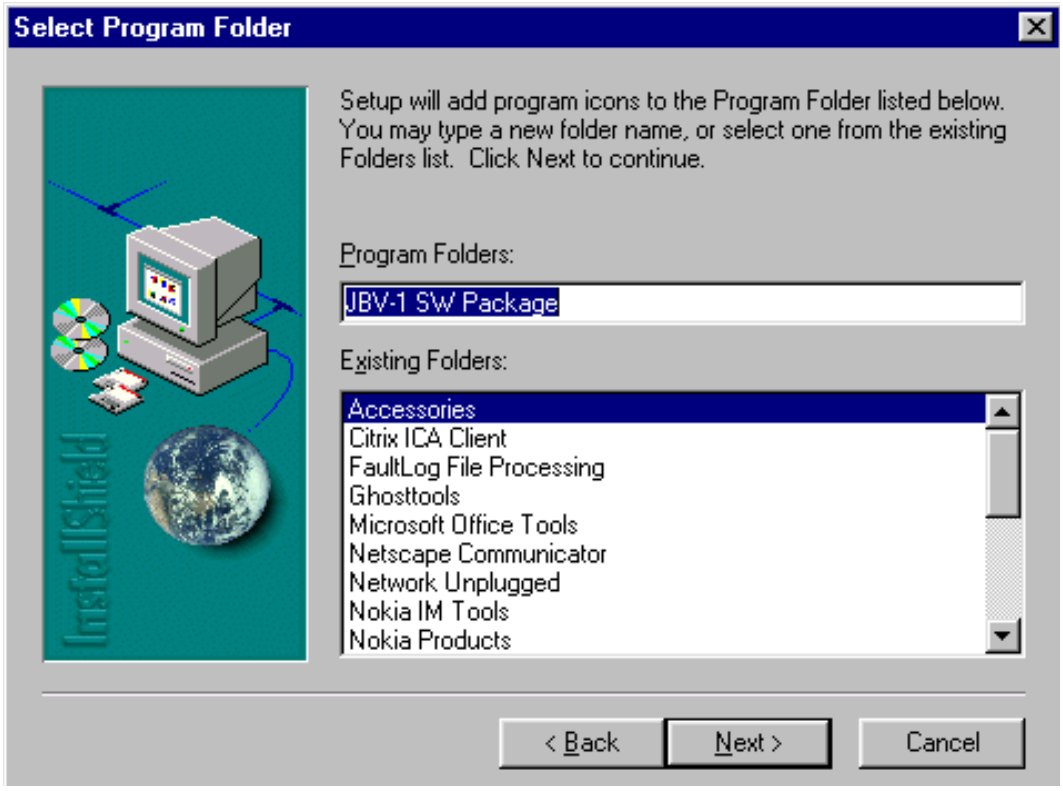
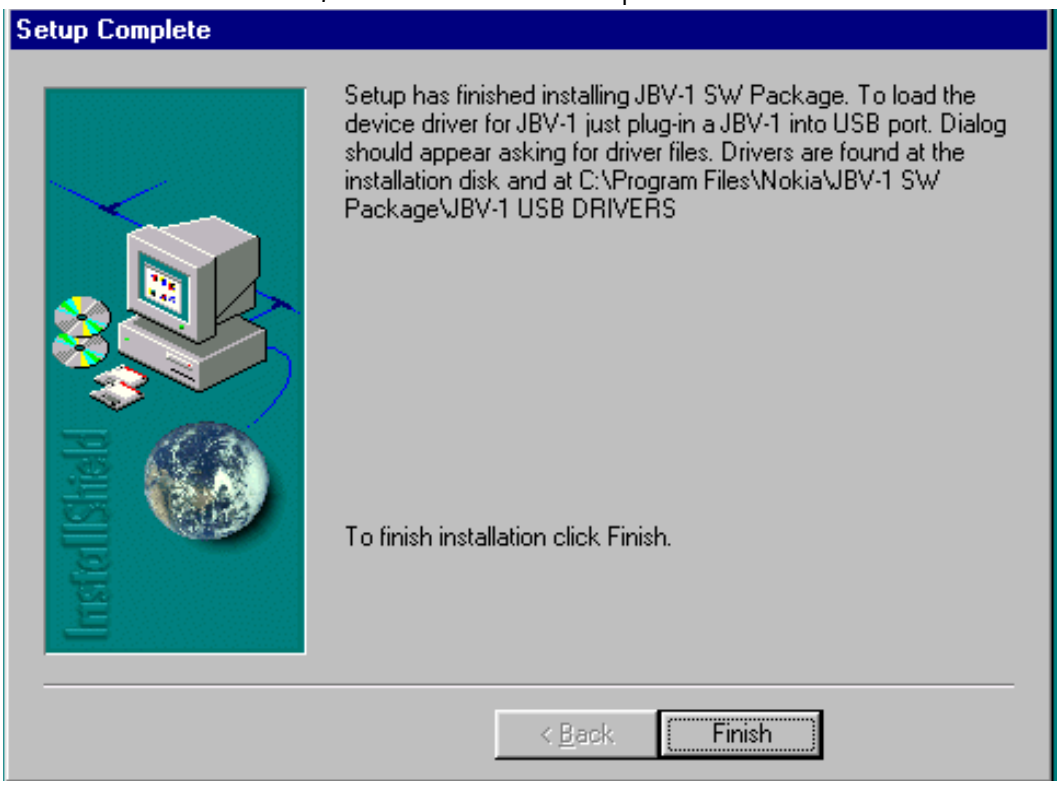
installed.



After successful installation, choose "Finish" to complete.


Setup Complete
Setup has finished installing JBV-1 SW Package. To load the device driver for JBV-1 just plug-in a JBV-1 into USB port. Dialog should appear asking for driver files. Drivers are found at the installation disk and at C:\Program Files\Nokia\JBV-1 SW Package\JBV-1 USB DRIVERS
To finish installation click Finish.
InstallShield
< Back
Finish

NOW YOU CAN CONNECT THE USB CABLE / JBV-1 TO YOUR COMPUTER!

Connect power to JBV-1 (11-16V DC) from external power supply, then connect USB

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Cable between JBV-1 USB connector and PC.

Windows will detect connected USB cable and detect drivers for new HW.

Follow the instructions and allow Windows to search and install the best drivers available. After this procedure the actual JBV-1 SW update can begin.

Add New Hardware Wizard
This wizard searches for new drivers for:
USB Device
A device driver is a software program that makes a hardware device work.
< Back
Next >
Cancel

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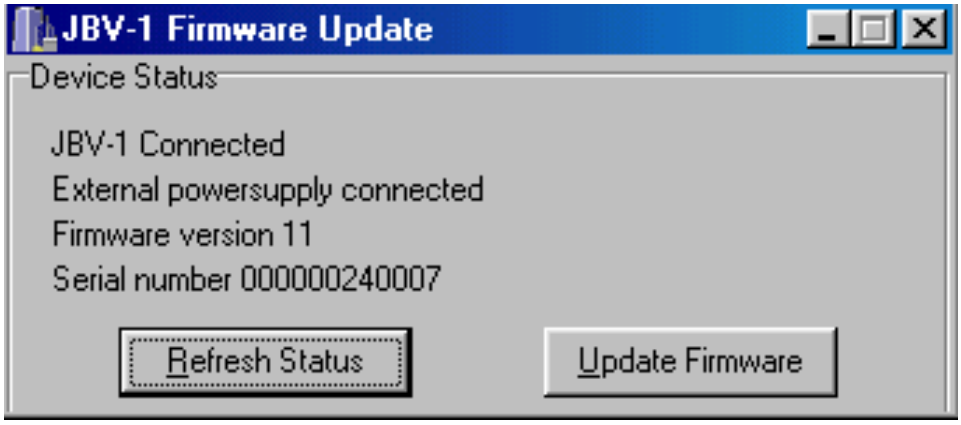
Updating the JBV-1 Docking Station Software

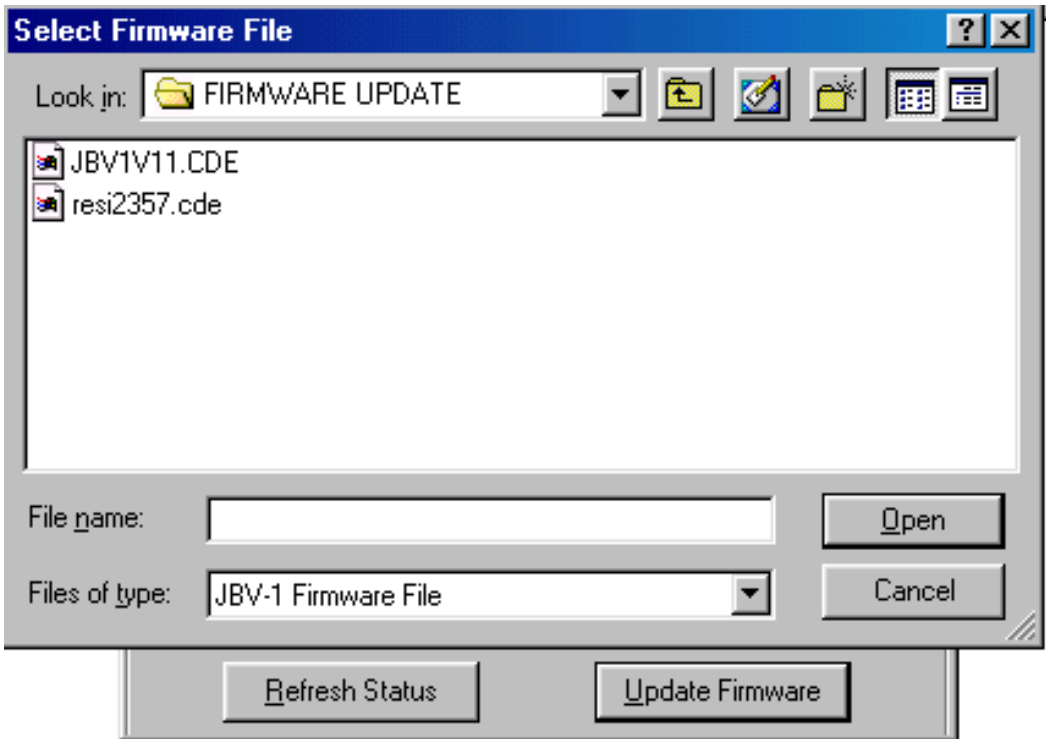
Go to folder *C:\Program Files\Nokia\ JBV-1 SW Package\ FIRMWARE UPDATE* and start JBV-1 Update SW by double clicking *fwup.exe.*

JBV-1 Firmware update starts and shows current status of the JBV-1 connected.

If firmware version read from your JBV-1 is not the latest one available, it needs to be updated by choosing "Update Firmware".



Choose file *JBV1v11.CDE* (example used here is for v 11) and "Open" to update your JBV-1.



After Successful update, current JBV-1 status will be shown. You have now updated the

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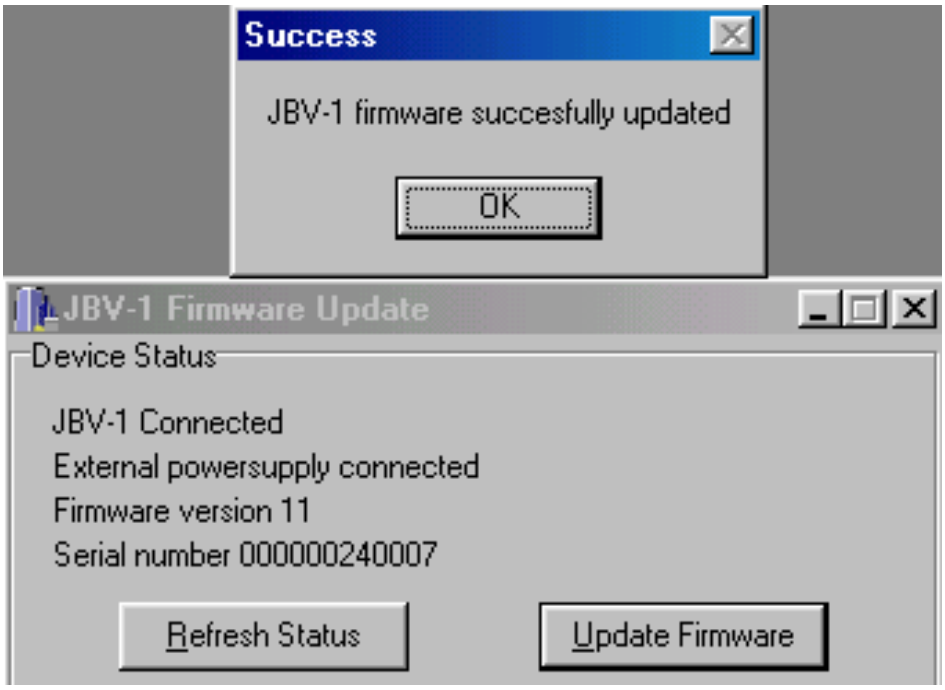
software of your JBV-1 docking station and it is ready for use.



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Receiver tuning: Quick Guide for Tuning With Phoenix

General remarks

RF tunings must be performed in the same order as shown in this document. The order of the corresponding menu items in the Service SW may be different.

If baseband tunings are needed, they should be completed before the RF tunings.

Avoid unnecessary tuning – factory-tuning values are always the most accurate ones.

NOTE! RF tunings need to be done ONLY if any RF block component is replaced.

Screen shots described in this document may change as the service software is developed.

Kindly refer to the Phoenix help files, the phone model specific service manual and bulletins for help.

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Service Tool Concept for RF Tuning Operations

NOTE! RF tunings need to be done ONLY if any RF block component is replaced.

- All RF tuning operations must be carried out in the MJS-38 Module Jig!
- Power to MJS-38 must be supplied from an external DC power supply, not FPS-8 prommer
- MJS-38 input voltages:

  Maximum + 5 VDC

  Nominal input for RF tunings is +4.2 V DC

  Minimum +3V DC

- Remember the cable attenuation when setting required RF levels

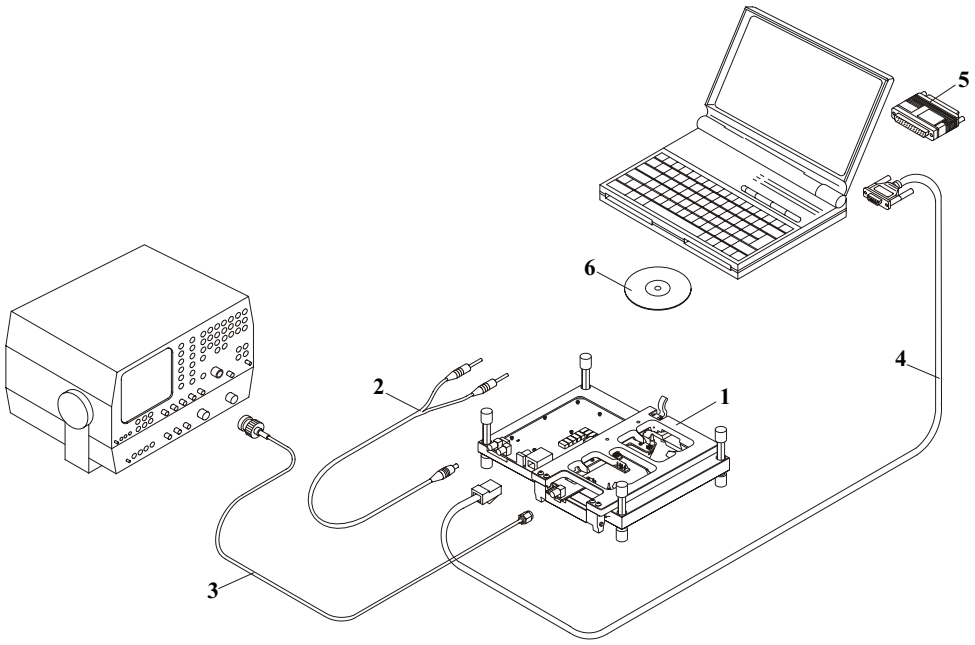

Figure 1: RF tuning setup

Item:	Service accessory:	Type:	Product code:
1	Module jig	MJS-38	0770416
2	DC power cable	PCS-1	0730012
3	Modular cable	XRF-1	0730085
4	Service Mbus cable	DAU-9S	0730108
5	Software protection key	PKD-1	0750018

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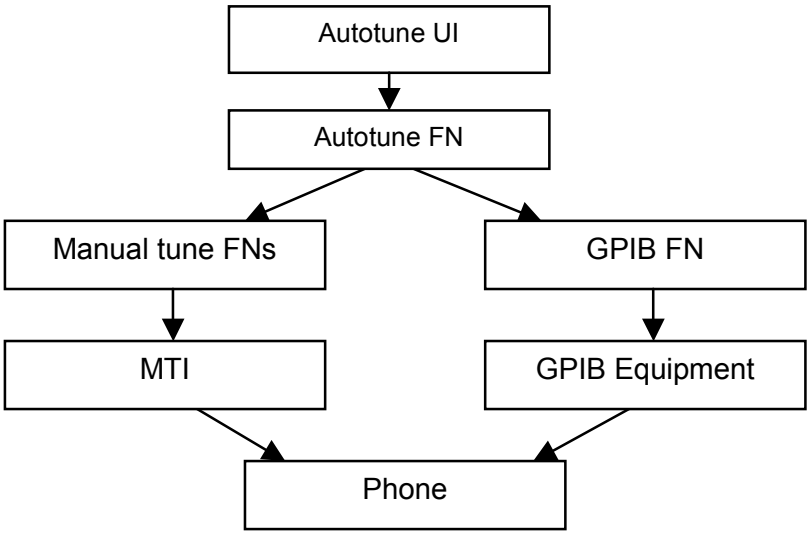
Item:	Service accessory:	Type:	Product code:
6	Service SW	CD-ROM	

Autotuning

General

Autotune feature is designed to align product's RF part easier and faster. By this autotune component product is tuned automatically. User needs to press only one button (named 'Tune') and product's RF is tuned and results are shown to the user. Component controls all the needed RF equipment (RF generator and TX measuring device), except voltage supplier.

Following diagram describes how the Autotune component is located in the TSS architecture:

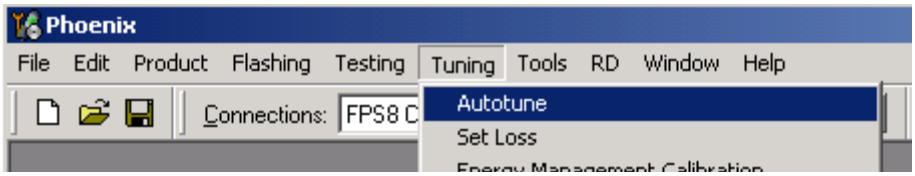


Autotune is a pair of two different components. First is User Interface and another is FunctioNal. UI does not contain any functionality. MTI takes care of phones messages.

Autotune can be done by two ways, with VSA-series (Agilent) meters and with CMU (Rohde & Schwarz) Radio Communication tester.

Autotune with VSA

The Autotune component can be found under Tuning menu:



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Environment

Hardware requirements:

PC with Windows 98/2000/NT

Power supply

Product specific module jig

RF-splitter and -cables

RF equipment (only one of each is needed)

Tx:

Agilent E4406 (VSA series transmitter tester)

Agilent E4445 (PSA series transmitter tester)

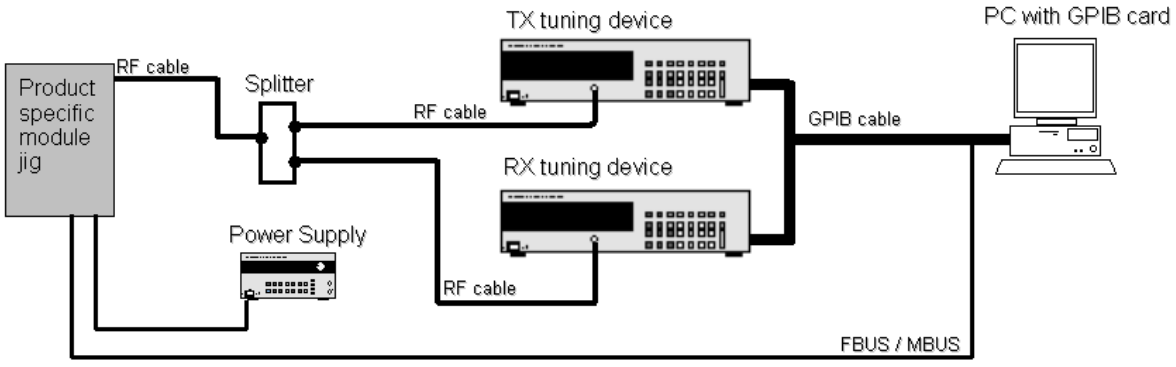
Rohde&Schwarz, FSE-family of Signal Analyzers

Rohde&Schwarz, FSIQ-family of Signal Analyzers

Rx:

Agilent ESG family of RF Signal Generators

Rohde&Schwarz, SME-family of Signal Generators



GPIB addresses are not defined. Component finds the addresses and uses them automatically.

If several TX tuning devices are connected, this component uses Agilent (VSA or PSA). In RX side, Agilent has highest priority.

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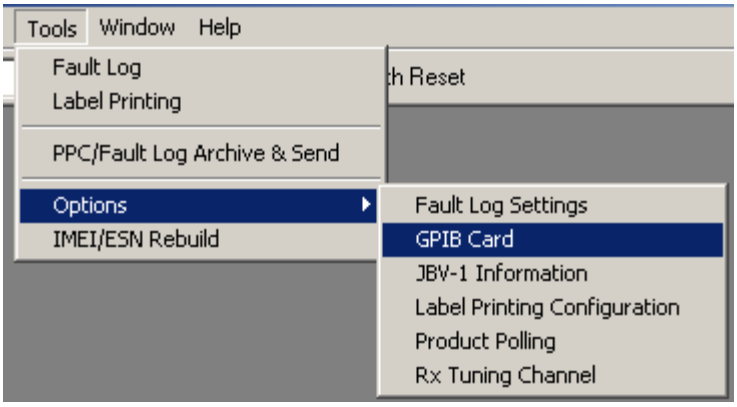
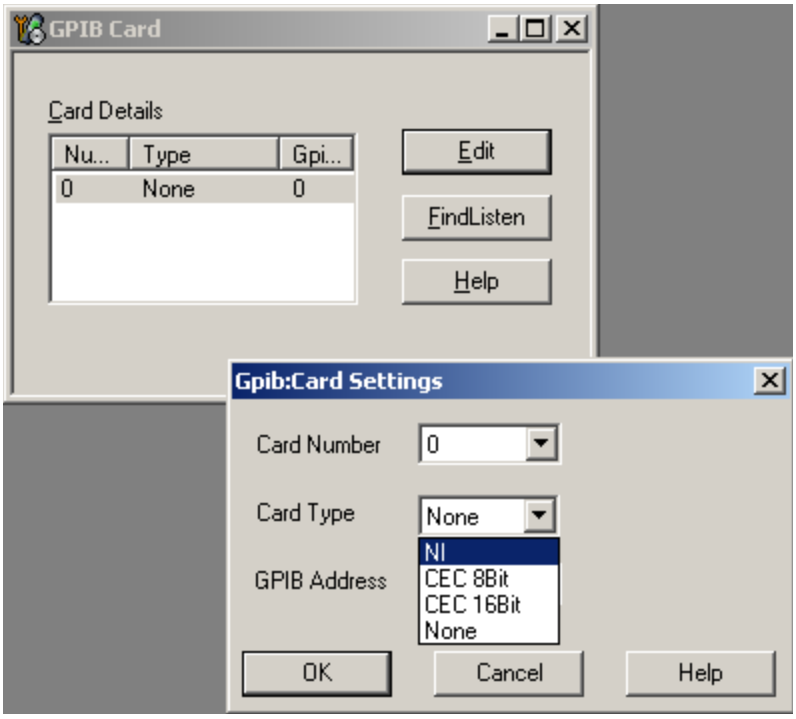
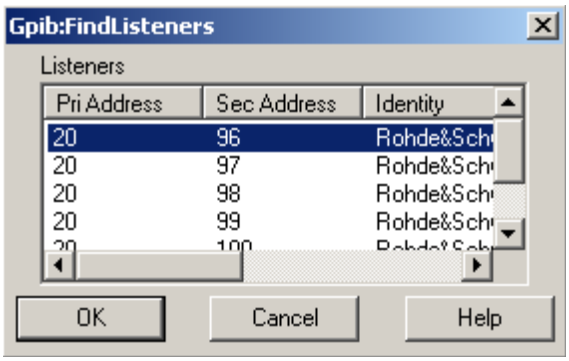
Autotune with CMU

First of all you have to initialize GPIB-card.







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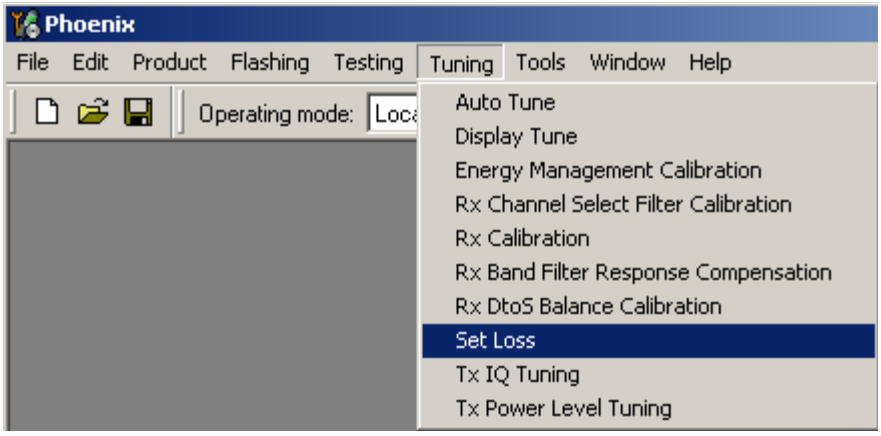
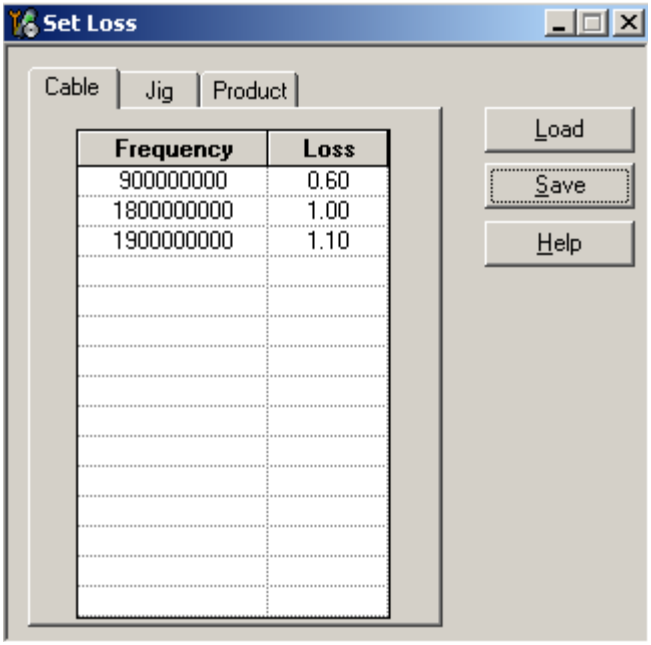
After GPIB-card initializing you can go to Autotune part. First you have to set losses of jig and RF-cables. If you have PKD-1 or PKD-1P dongle it is not possible to set loss.



First set RF-cable losses. The example is for 1.5 m cable.



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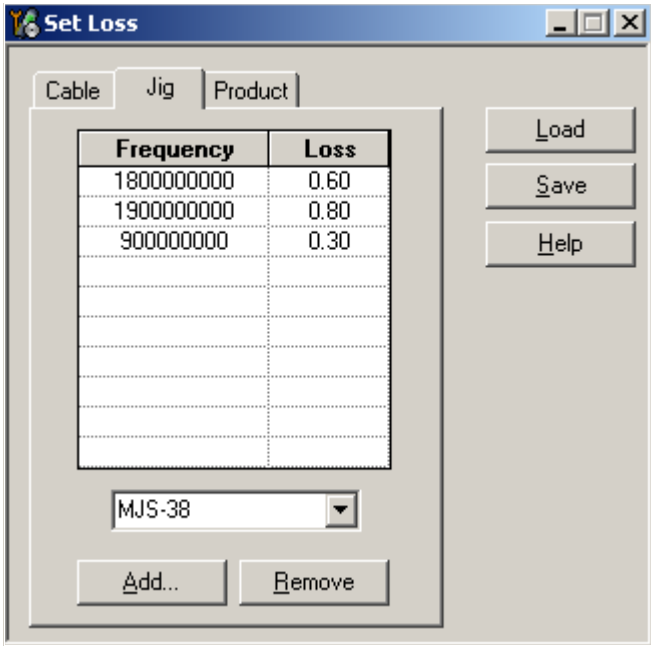
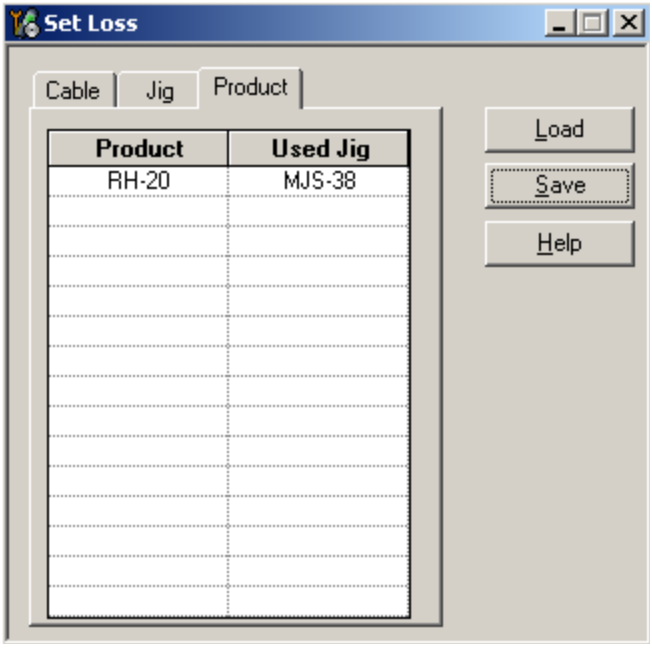
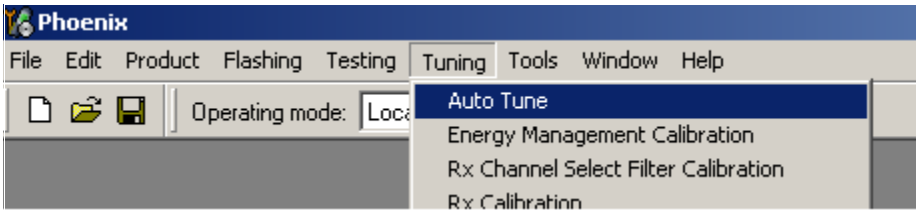
Then set the jig losses. The example is for MJS-38.



Finally choose the right product.



The Autotune component can be found under Tuning menu.



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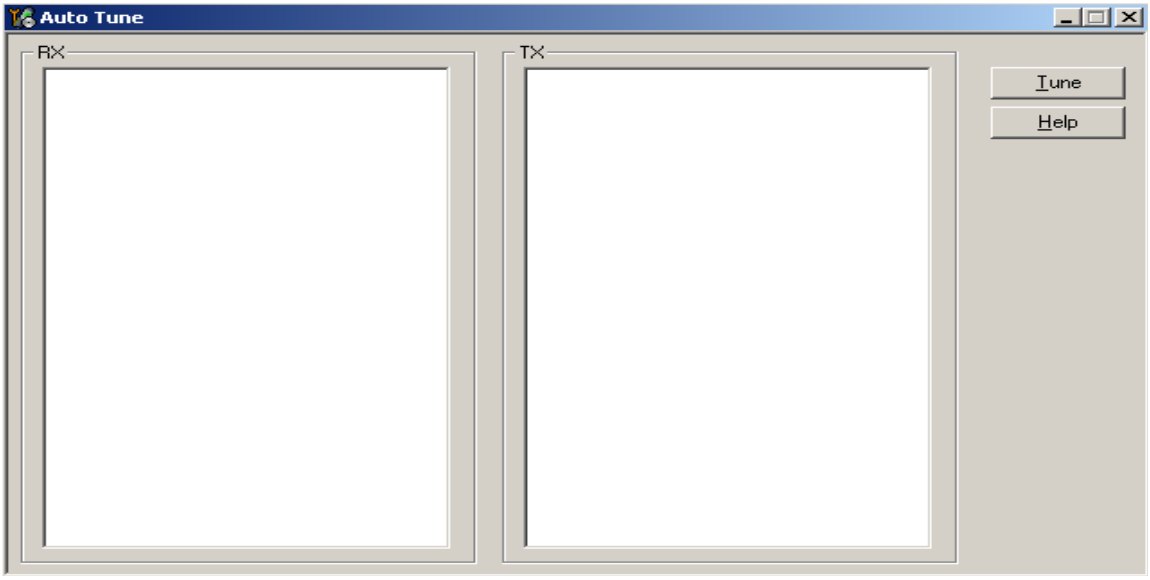
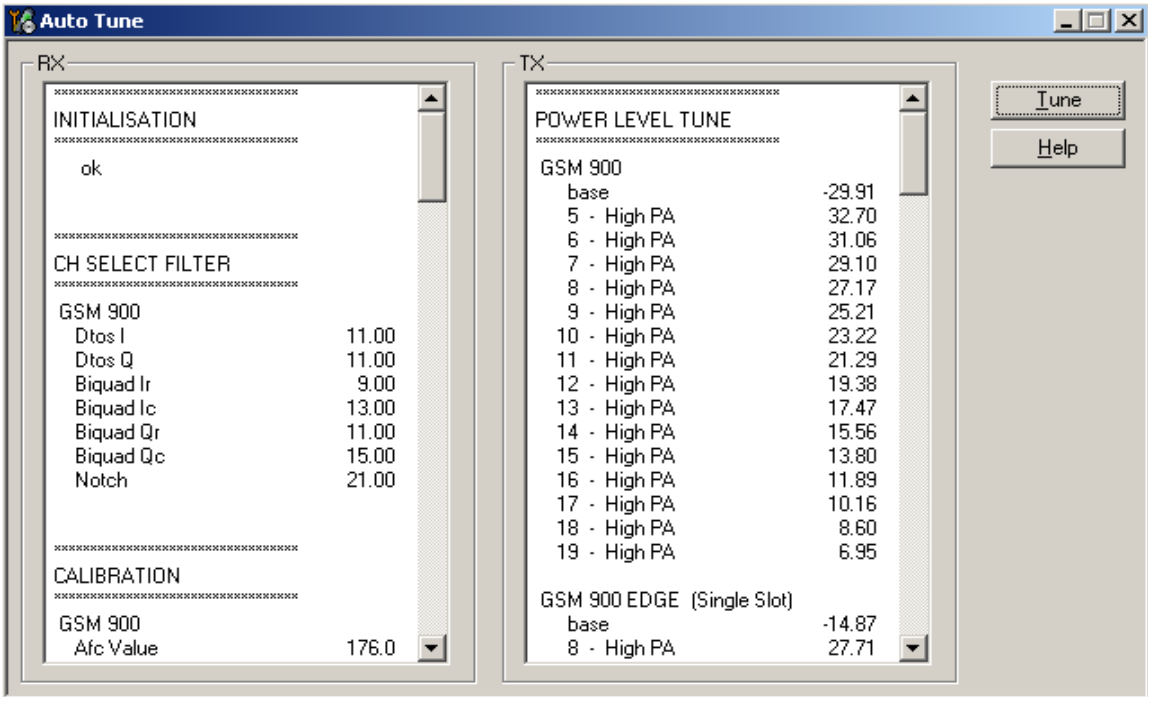
Press Tune button and autotune will start.



The results look like this.



Environment

Hardware requirements:

PC with Windows 98/2000/NT

Power supply

Product specific module jig

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RF -cable

Rohde&Schwarz, CMU 200 Radio Communication Tester

Protection

Components are protected by PKD-1CS, PKD-1NS, PKD-1 and PKD-1P dongles using standard TSS protection procedure. Autotuning itself is possible with all those dongles but with PKD-1P and PKD-1 dongles user is not able to set the loss.

Receiver Manual Tuning

RX Channel Select Filter Calibration

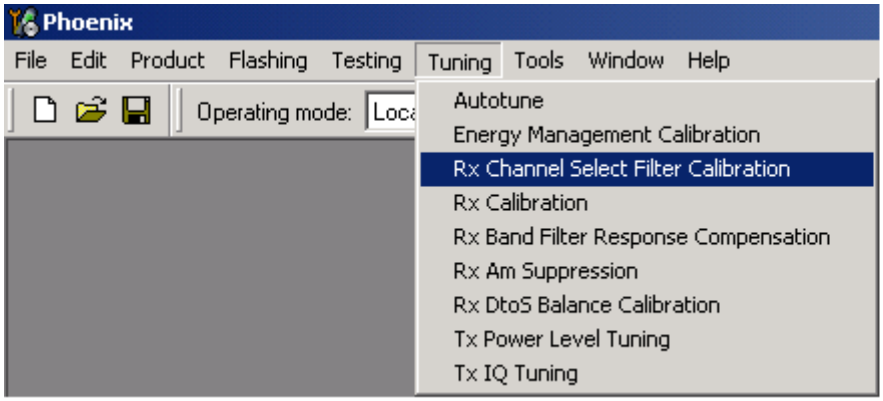
Extra equipment / external RF signal not needed.

Must be done before other RX calibrations.

This function is used to calibrate RX channel select filter in GSM Phones.

Rx Channel select filter is tuned only in one band = Single calibration for both bands.

Select Tuning => Rx Channel select filter calibration.



"Save to Phone " is checked by default

Uncheck "Save to Phone " if you don´t want the values to be saved to phone (eg testing)!

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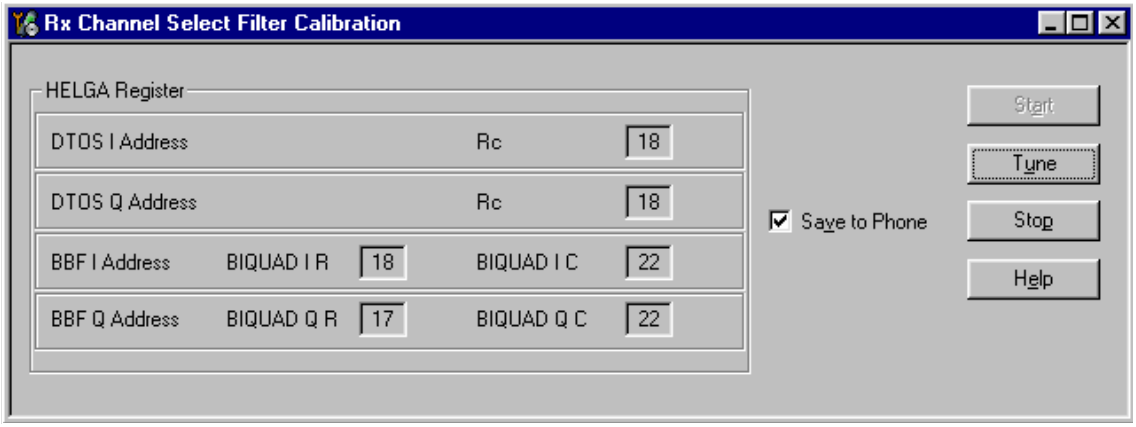
Press "Tune" to start the tuning



Tuning values must be 0...31

If values shown are within limits, choose “Stop”

Close the “RX Channel Select Filter Calibration“-dialog to end tuning

Close the Rx Channel select filter calibration dialog, the values are saved to phone

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RX Calibration

RF generator needed.

This tuning performs RX Calibration.

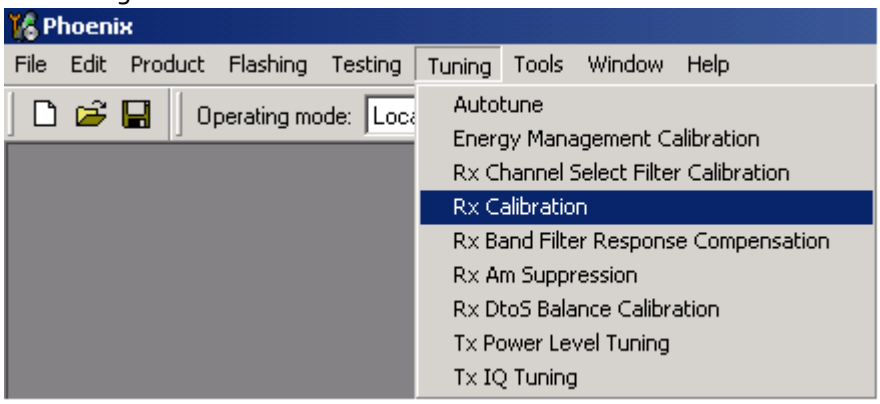
Must be done separately on every band!

Calibration is automatically performed at GSM900, then at GSM1800 and finally at GSM1900 band. If tuning is successful, it continues in the next band.

AFC tuning is done while GSM900 band RX Calibration is performed.

Remember to take jig and cable attenuations into account!

Select Tuning => Rx calibration



Press "Start"´to start tuning.

Set RF generator to required GSM900 frequency => OK

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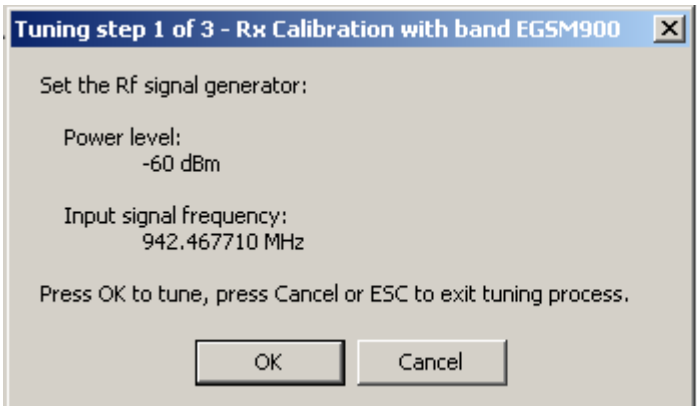
Set RF generator to required frequency => OK


Tuning step 1 of 3 - Rx Calibration with band EGSM900
Set the Rf signal generator:
Power level:
-60 dBm
Input signal frequency:
942.467710 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Tuning values and ADC readings are shown.

Typical values and limits in GSM900 RX Calibration:

GSM900	Typical value	Low limit	High limit
Afc value:	130	-350	350
Afc slope:	140	90	165

900				
		typ	min	max
rssi	0	65	55	75
rssi	1	71	61	81
rssi	2	77	67	87
rssi	3	83	73	93
rssi	4	89	79	99
rssi	5	94	84	104
rssi	6	100	90	110
rssi	7	106	96	116
rssi	8	112	102	122
rssi	9	118	108	128
rssi	10	124	114	134
rssi	11	130	120	140
rssi	12	136	126	146
rssi	13	142	132	152
rssi	14	148	138	158

Press “Save and continue”, then starts GSM1800 calibration.

Set RFgenerator to required GSM1800 frequency => OK

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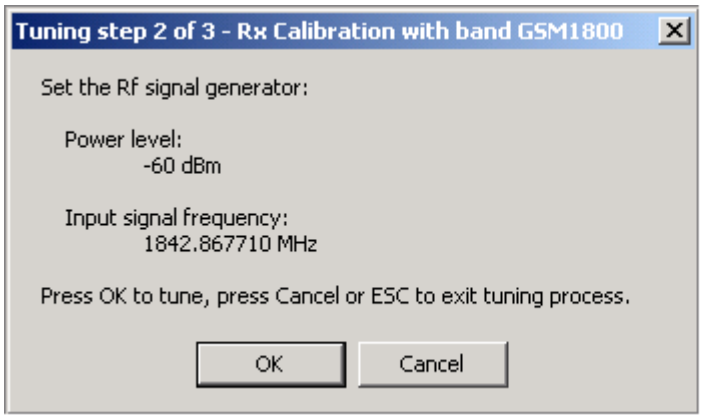

Tuning step 2 of 3 - Rx Calibration with band GSM1800
Set the Rf signal generator:
Power level:
-60 dBm
Input signal frequency:
1842.867710 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

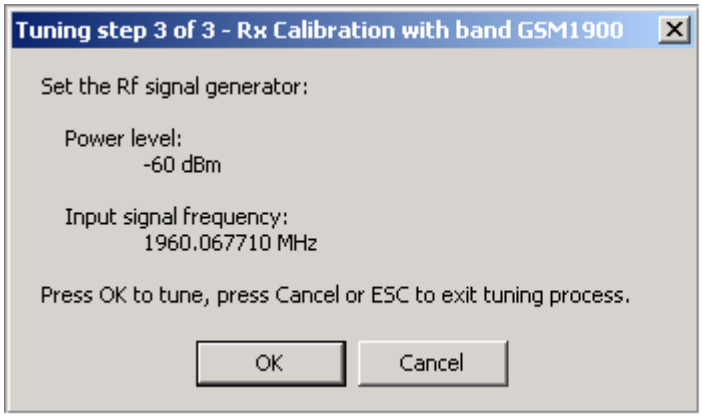
Tuning values and ADC readings are shown.

Typical values and limits in (GSM1800) RX Calibration

		1800		
		typ	min	max
rssi	0	63	53	73
rssi	1	69	59	79
rssi	2	75	65	85
rssi	3	81	71	91
rssi	4	87	77	97
rssi	5	92	82	102
rssi	6	98	88	108
rssi	7	104	94	114
rssi	8	110	100	120
rssi	9	116	106	126
rssi	10	122	112	132
rssi	11	128	118	138
rssi	12	134	124	144
rssi	13	140	130	150
rssi	14	146	136	156

Press "Save and continue", then starts GSM1900 calibration.

Set the RF generator to required GSM1900 frequency => OK


Tuning step 3 of 3 - Rx Calibration with band GSM1900
Set the Rf signal generator:
Power level:
-60 dBm
Input signal frequency:
1960.067710 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

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Tuning values and ADC readings are shown.

Typical values and limits in (GSM1900) RX Calibration

1900				
		typ	min	max
rssi	0	66	56	76
rssi	1	72	62	82
rssi	2	78	68	88
rssi	3	84	74	94
rssi	4	90	80	100
rssi	5	94	84	104
rssi	6	99	89	109
rssi	7	105	95	115
rssi	8	111	101	121
rssi	9	117	107	127
rssi	10	123	113	133
rssi	11	129	119	139
rssi	12	135	125	145
rssi	13	141	131	151
rssi	14	147	137	157

Press “Save and continue”.

If values are within limits, they are saved to the phone after successful tuning of each band.

Close the “Rx Calibration” dialog to end tuning

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RX Band Filter Response Compensation

RF generator needed.

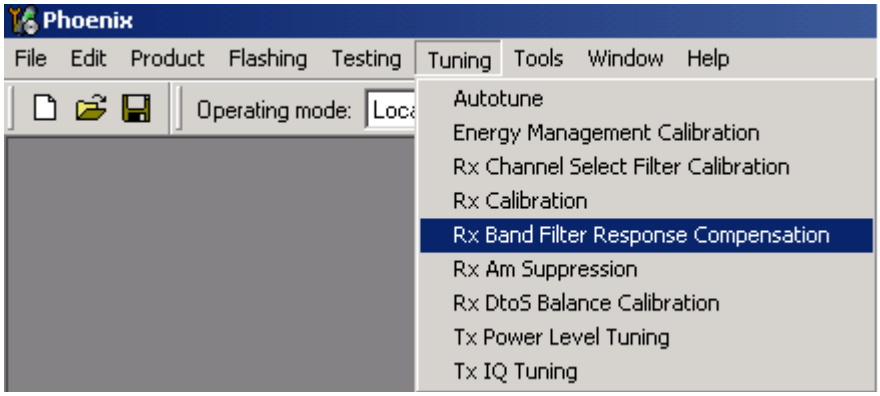
This operation must be done separately on each band!

Start RX Calibration at GSM900, then continue at GSM1800 band and finally on the GSM1900 band

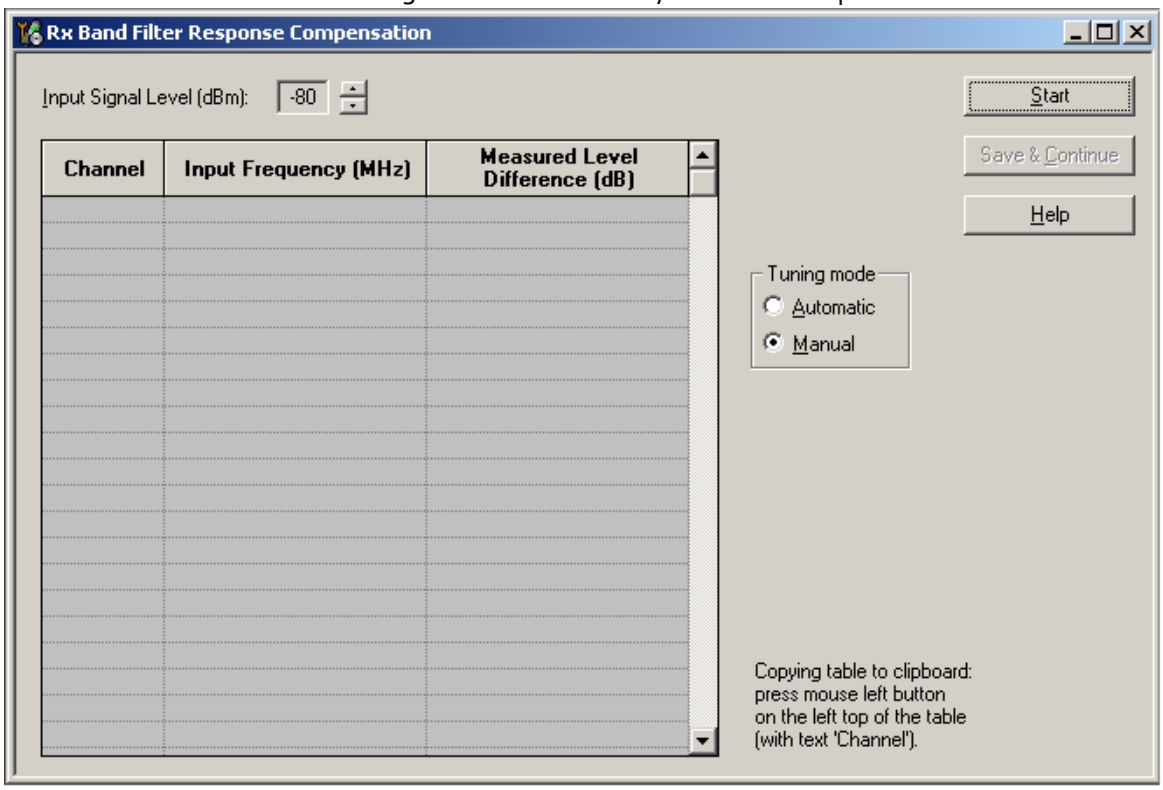
NOTE! Remember to do RX calibration before doing Rx Band Filter Response Compensation!

Remember to take jig and cable attenuations into account!

Select Tuning => Rx band filter response compensation



Press "Start" to start tuning with values already saved to the phone

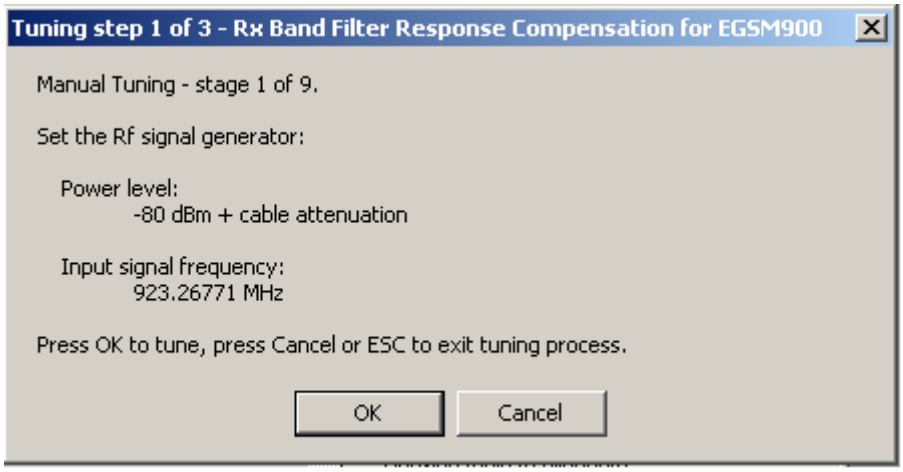


Select "Manual tuning" and tuning starts.

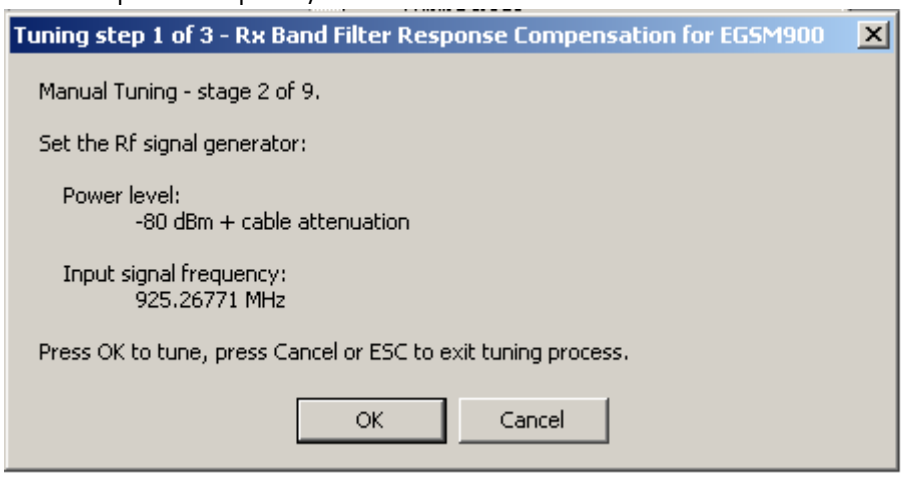
You are asked to supply 9 different RF frequencies to the phone.

The tuning begins from GSM900 band and continues the same way for GSM 1800 and GSM1900 bands

Set the first required frequency and level => OK


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 1 of 9.
Set the Rf signal generator:
Power level:
-80 dBm + cable attenuation
Input signal frequency:
923.26771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Set the 2nd required frequency and level => OK


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 2 of 9.
Set the Rf signal generator:
Power level:
-80 dBm + cable attenuation
Input signal frequency:
925.26771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

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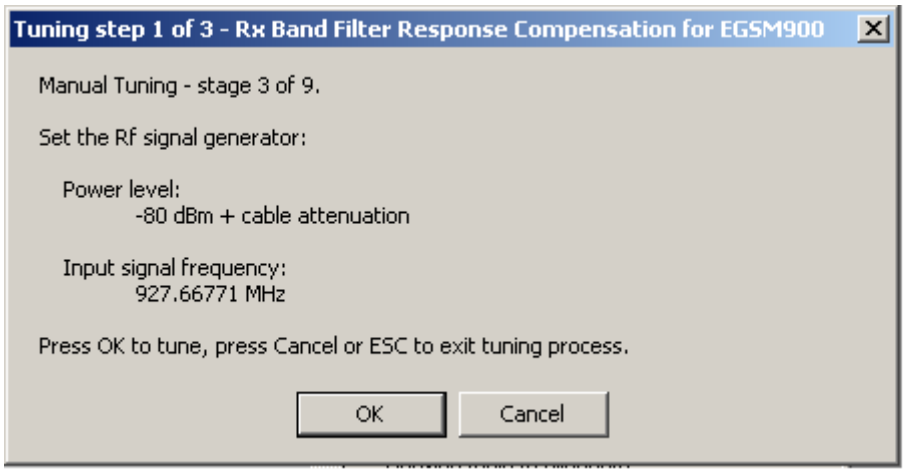
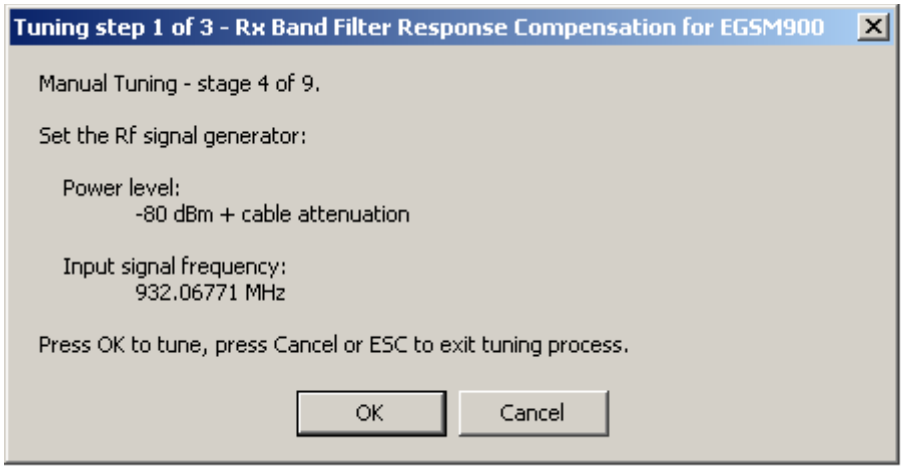
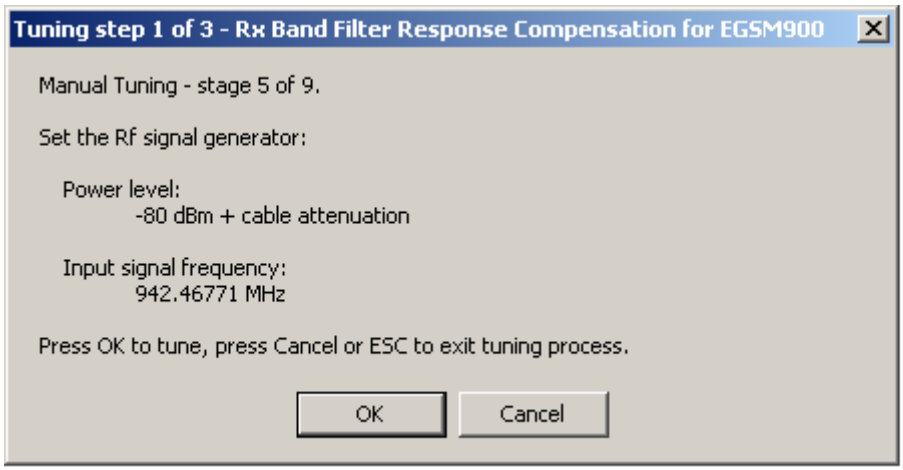
Set the 3rd required frequency and level => OK


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 3 of 9.
Set the Rf signal generator:
Power level:
-80 dBm + cable attenuation
Input signal frequency:
927.66771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

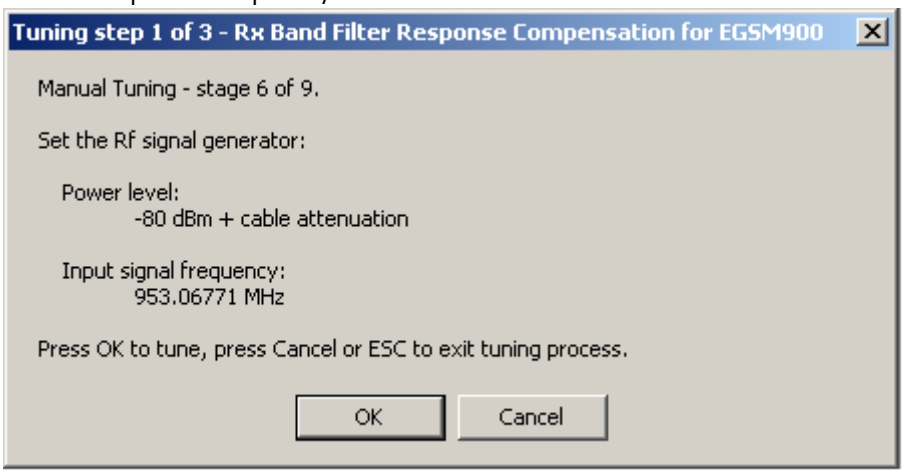
Set the 4th required frequency and level => OK


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 4 of 9.
Set the Rf signal generator:
Power level:
-80 dBm + cable attenuation
Input signal frequency:
932.06771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

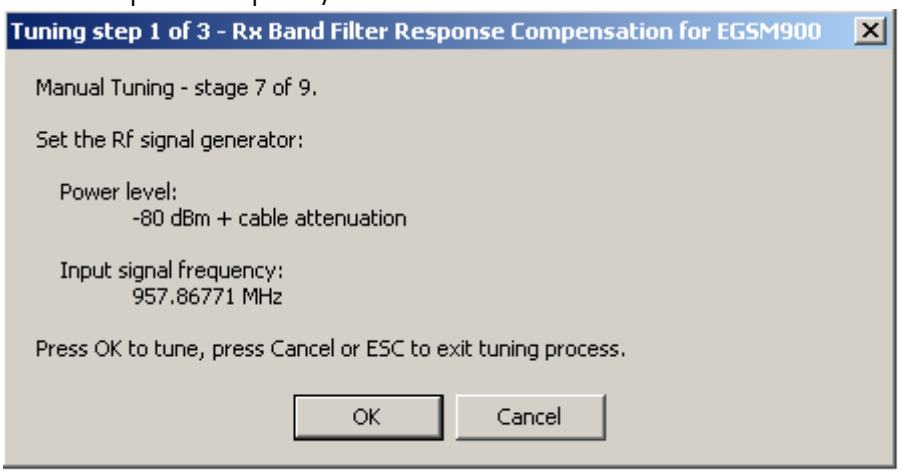
Set the 5th required frequency and level => OK


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 5 of 9.
Set the Rf signal generator:
Power level:
-80 dBm + cable attenuation
Input signal frequency:
942.46771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

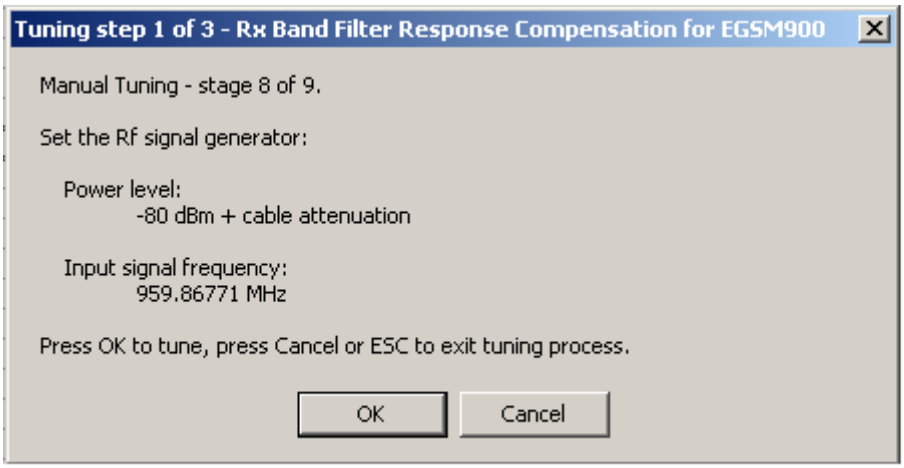
Set the 6th required frequency and level => OK


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 6 of 9.
Set the Rf signal generator:
Power level:
-80 dBm + cable attenuation
Input signal frequency:
953.06771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Set the 7th required frequency and level => OK


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 7 of 9.
Set the Rf signal generator:
Power level:
-80 dBm + cable attenuation
Input signal frequency:
957.86771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

Set the the 8th required frequency and level => OK


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 8 of 9.
Set the Rf signal generator:
Power level:
-80 dBm + cable attenuation
Input signal frequency:
959.86771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel

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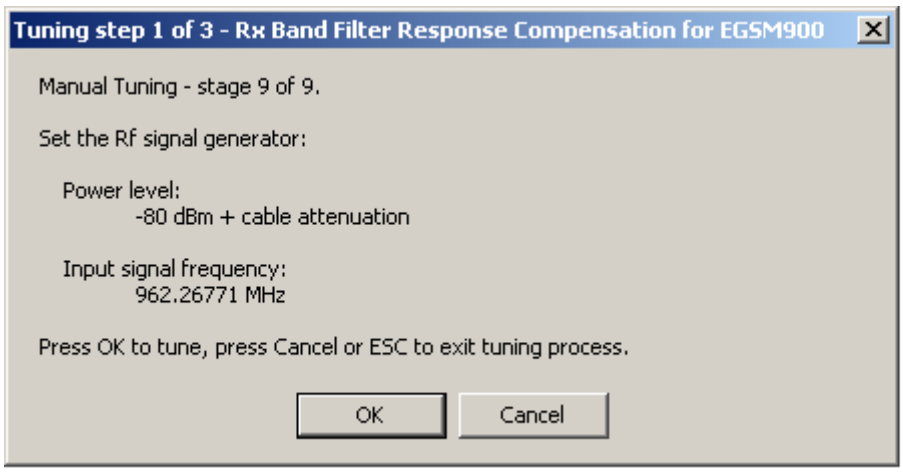
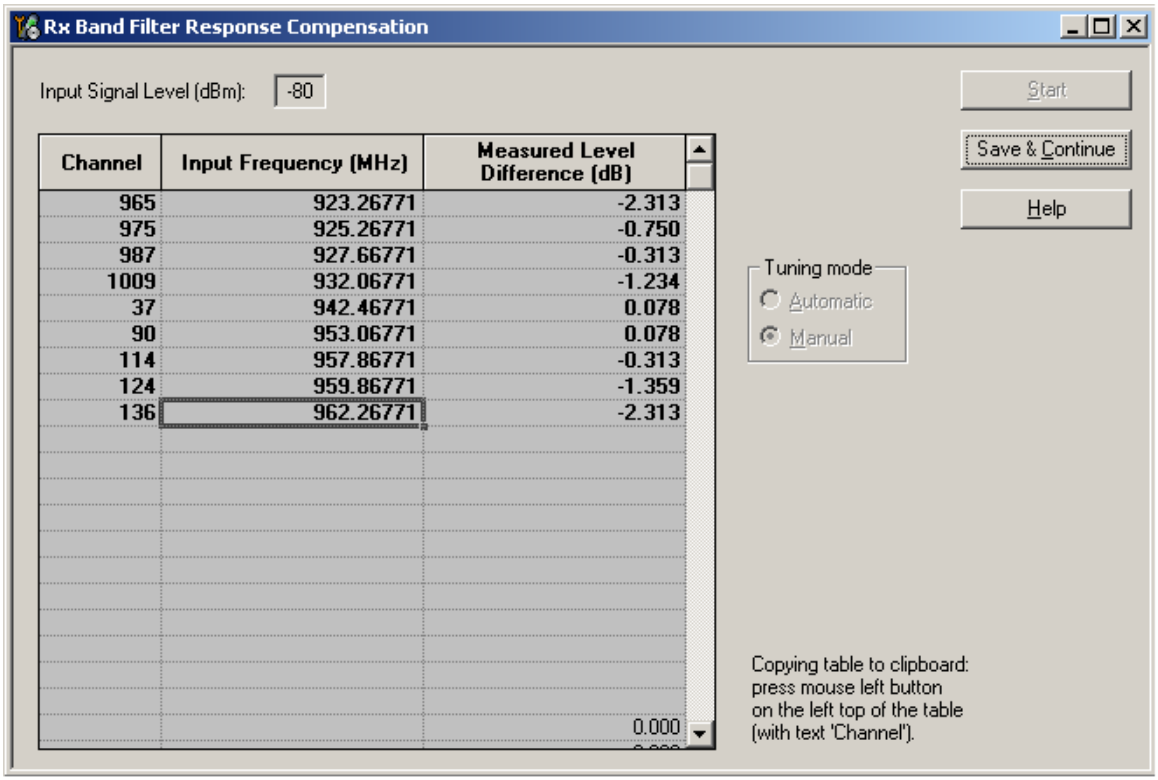
Set 9th required frequency and level => OK


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
Manual Tuning - stage 9 of 9.
Set the Rf signal generator:
Power level:
-80 dBm + cable attenuation
Input signal frequency:
962.26771 MHz
Press OK to tune, press Cancel or ESC to exit tuning process.
OK
Cancel



Limits in Rx Band Filter Response Compensation GSM900:

Channel	Input Frequency (MHz)	Low limit (dB)	High limit (dB)
965	923.26771	-10	3.5
975	925.26771	-3.5	3.5
987	927.66771	-3.5	3.5
1009	932.06771	-3.5	3.5
37	924.46771	-3.5	3.5
90	953.06771	-3.5	3.5
114	957.86771	-3.5	3.5
124	959.86771	-3.5	3.5
136	962.26771	-10	3.5

If the values shown are within limits, press "Save and continue" to save values to the phone, then the GSM1800 tuning starts automatically.

Repeat the same steps as for the GSM900 band above.

Limits in Rx Band Filter Response Compensation GSM1800:

Channel	Input Frequency (MHz)	Low limit (dB)	High limit (dB)
497	1802.26771	-10	3.5
512	1805.26771	-3.5	3.5
535	1809.86771	-3.5	3.5
606	1824.06771	-3.5	3.5
700	1842.86771	-3.5	3.5
791	1861.06771	-3.5	3.5
870	1876.86771	-3.5	3.5
885	1879.86771	-3.5	3.5
908	1884.46771	-10	3.5

If the values shown are within limits, press "Save and continue" to save values to the phone, then the GSM1900 tuning starts automatically.

Repeat the same steps as for the GSM900 and GSM1800 bands above.

Limits in Rx Band Filter Response Compensation GSM1900:

Channel	Input Frequency (MHz)	Low limit (dB)	High limit (dB)
496	1927.06771	-10	3.5
512	1930.26771	-3.5	3.5
537	1935.26771	-3.5	3.5
586	1945.06771	-3.5	3.5
661	1960.06771	-3.5	3.5
736	1975.06771	-3.5	3.5
794	1986.66771	-3.5	3.5
810	1989.86771	-3.5	3.5
835	1994.86771	-10	3.5

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If the values shown are within limits, press "Save and continue" to save values to the phone.

Close the "RX Band Filter Response Compensation" – dialog to end tuning.

Rx Am Suppression

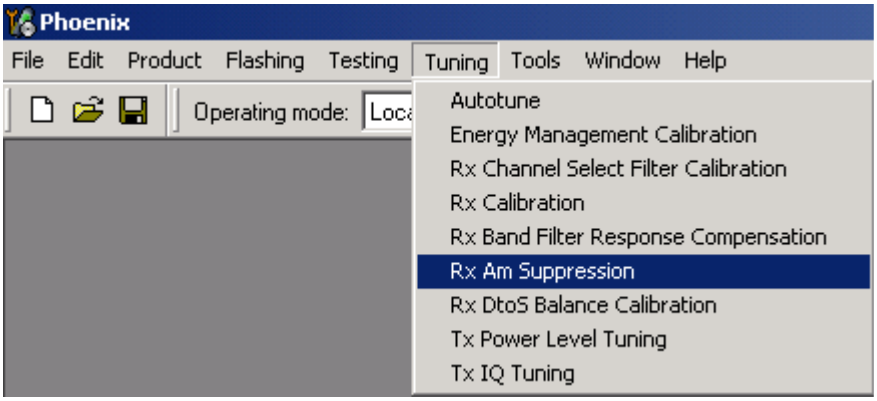
RF generator is needed.

Must be done separately on each band!

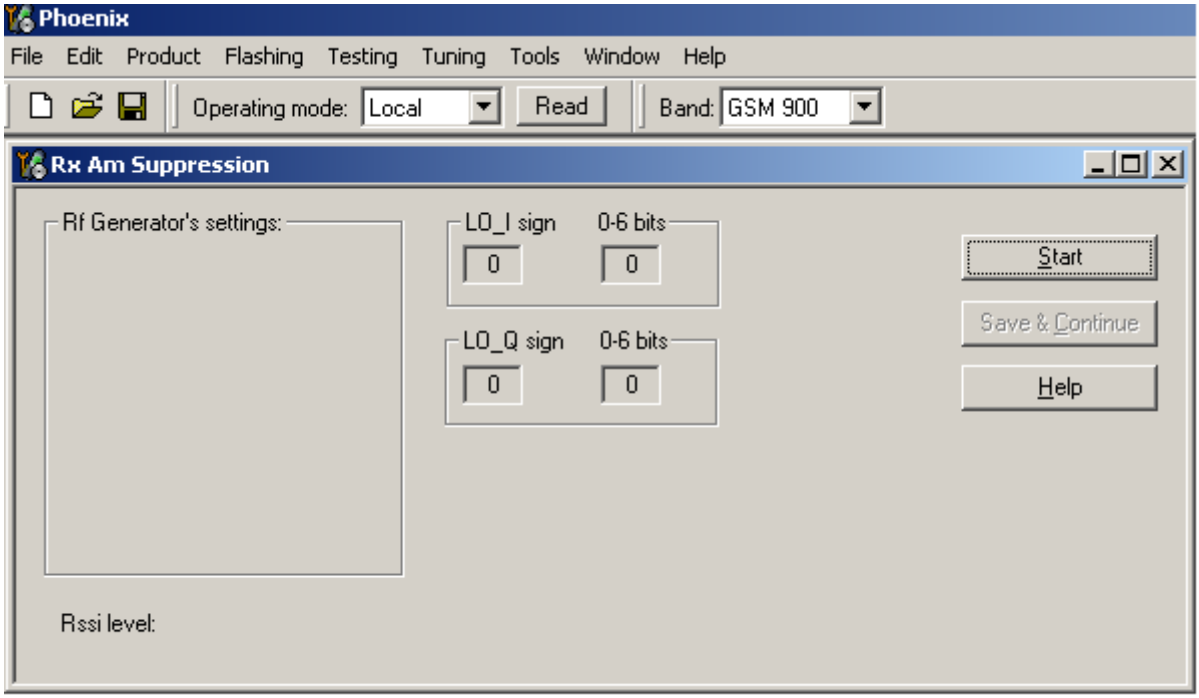
Start RX Am Suppression at GSM900, then continue at GSM1800 band and finally at the GSM1900 band.

Remember to take jig and cable attenuations into account!

Select Tuning => Rx Am Suppression



Press "Start" to begin tuning.



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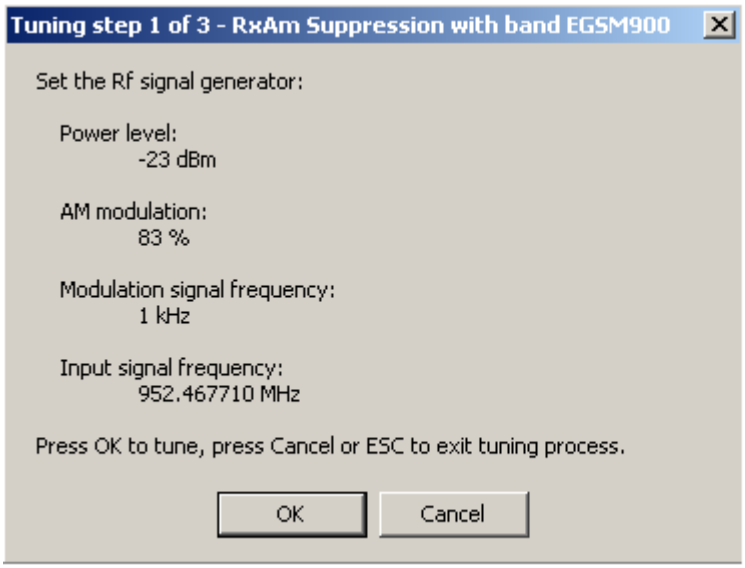
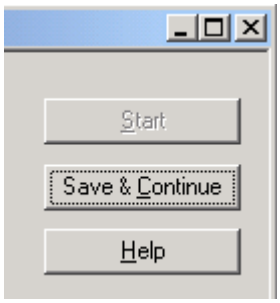
Adjust signal generator accordingly and press "OK" to tune.

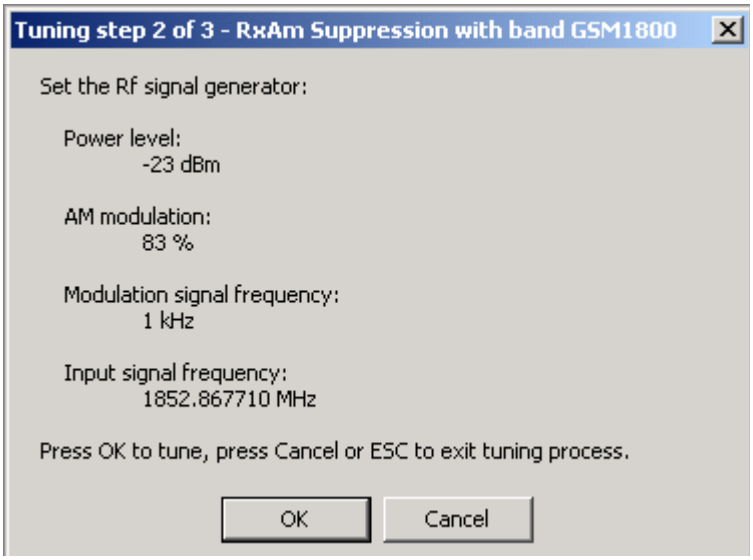


When tuning is finished, press "Save & Continue".

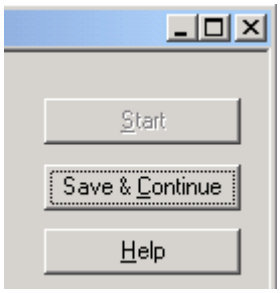


Tuning continues automatically at GSM1800 band.

Adjust signal generator accordingly and press "OK" to tune.

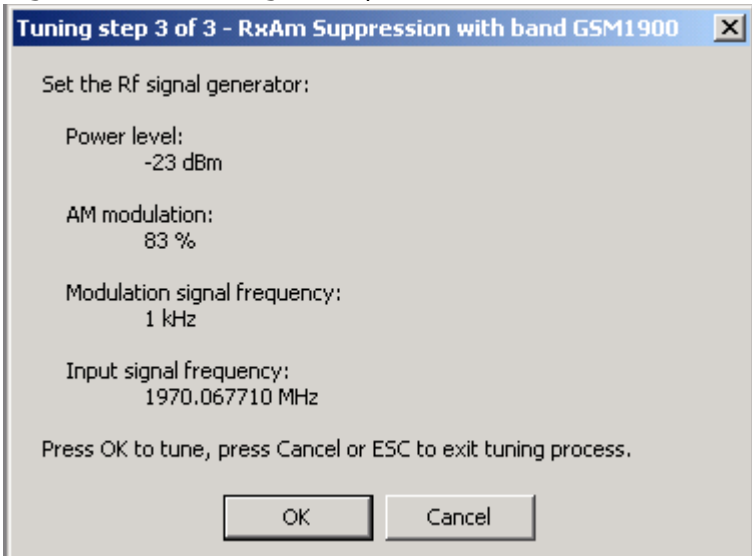


When tuning is finished, press "Save & Continue".

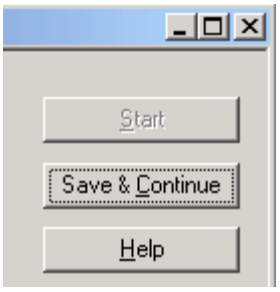


Tuning continues automatically at GSM1900 band.

Adjust signal generator accordingly and press "OK" to tune.



When tuning is finished, press "Save & Continue".



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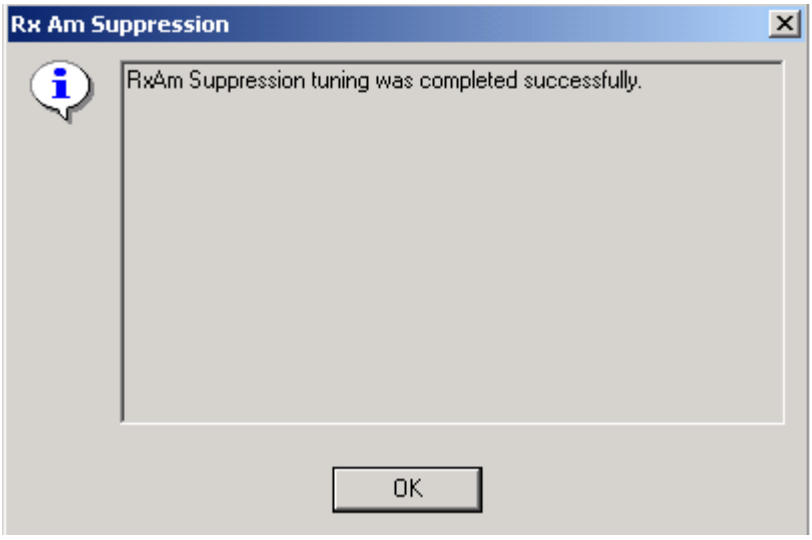
If the Rx Am Suppression tuning was completed successfully, press "OK" to stop tuning.



Close the Rx Am Suppression window.

RX DTOS balance calibration

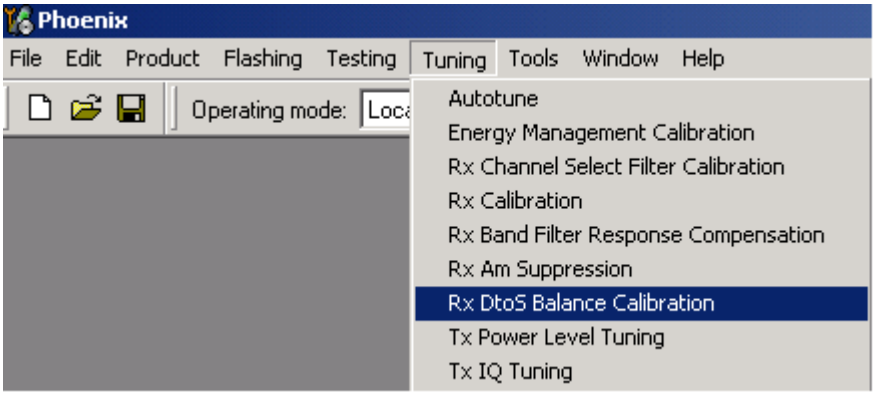
Extra equipment / external RF signal not needed

Must be done separately on each band!

Start RX Calibration for GSM900, then continue at the GSM1800 band and finally at the GSM1900 band.

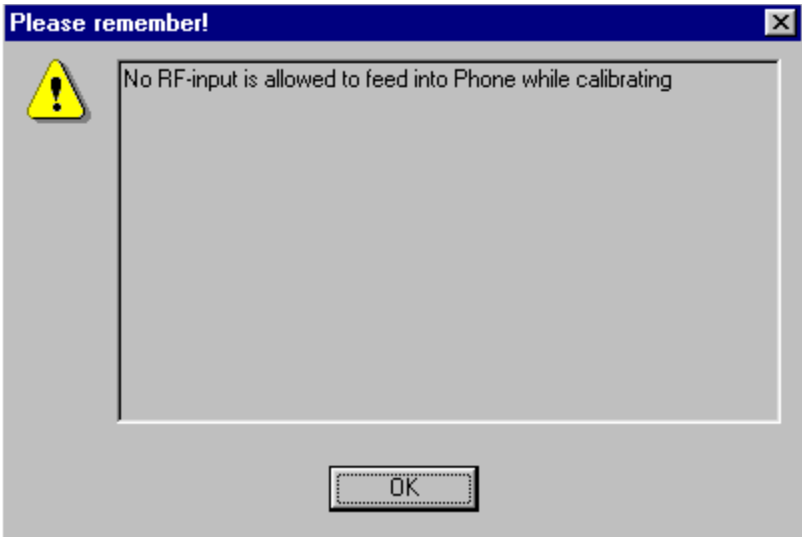
This Calibration is used for calibrating DSP control words values.

Select Tuning => Rx DtoS Balance Calibration



NOTE! No RF-input is allowed to feed when calibrating

Choose "OK" and "Start", tuning begins automatically at the GSM900 band.



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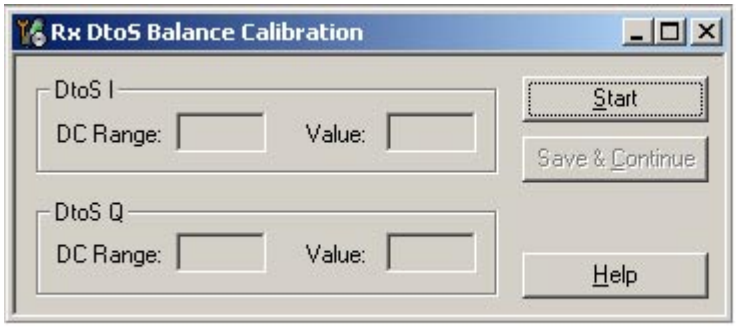
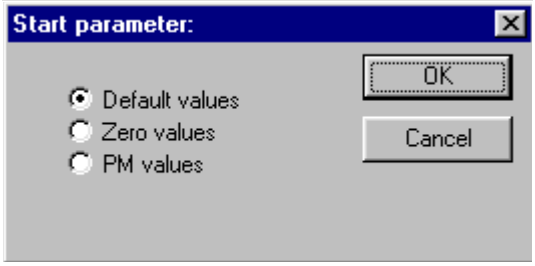
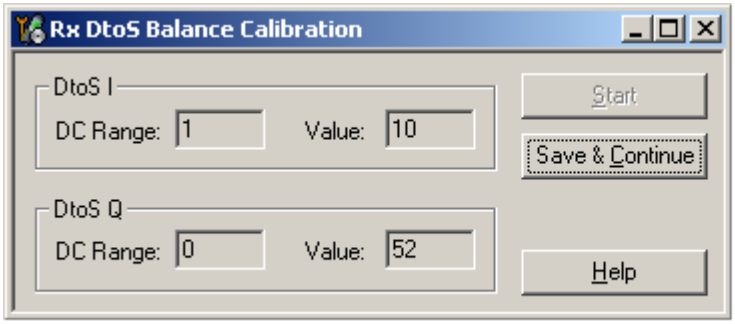
Press "Start" to start tuning.



Select "OK" to start tuning with values already saved to the phone



If values shown are within limits, press "Save and continue" to save values to the phone



GSM1800 and GSM1900 are calibrated automatically. If values are within limits, press "Save and continue" to save values to the phone.

Close the RX DtoS Balance Calibration dialog to end Receiver tuning.

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Transmitter Manual Tuning

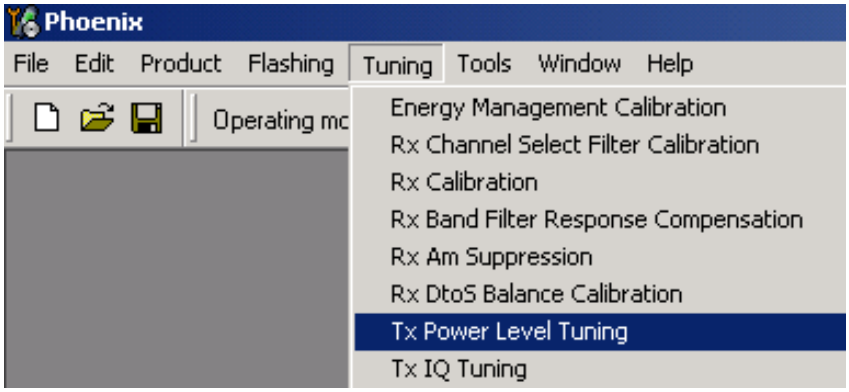
TX Power Level Tuning

Power meter or spectrum analyzer needed.

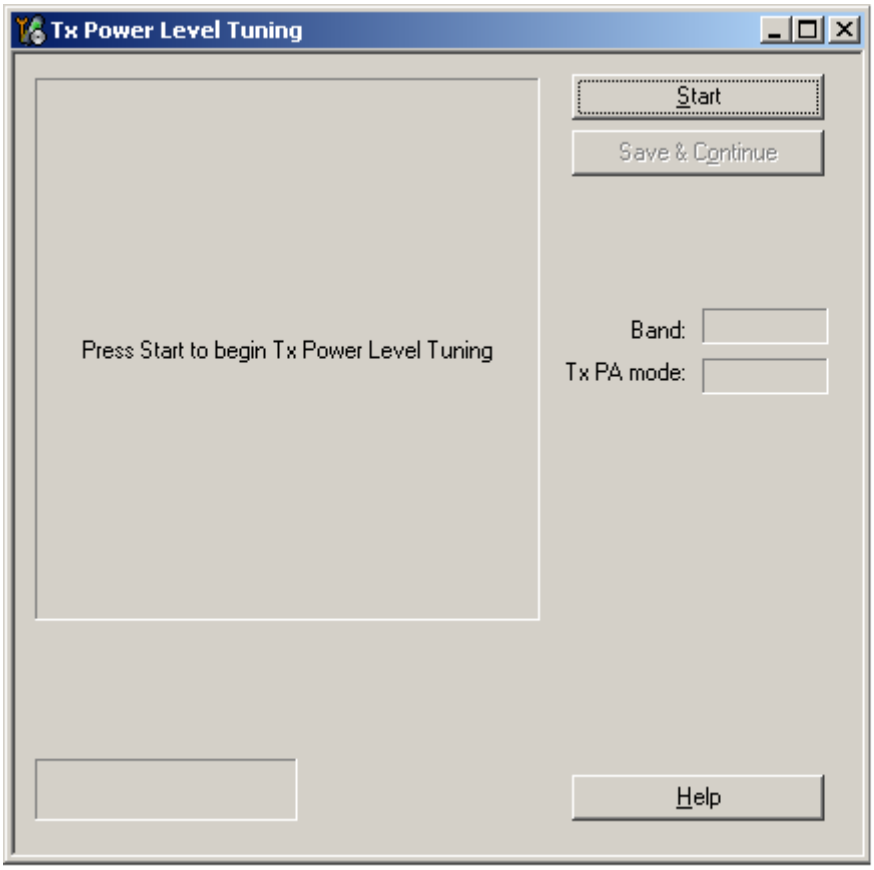
With Tx Power Level Tuning, the coefficients are adjusted for each power level.

Start Power Level tuning at GSM900/EDGE, then continue at GSM1800/EDGE band and finally at the GSM1900/EDGE band.

Tuning => Tx power level tuning



Select "Start", tuning begins at the GSM900 band



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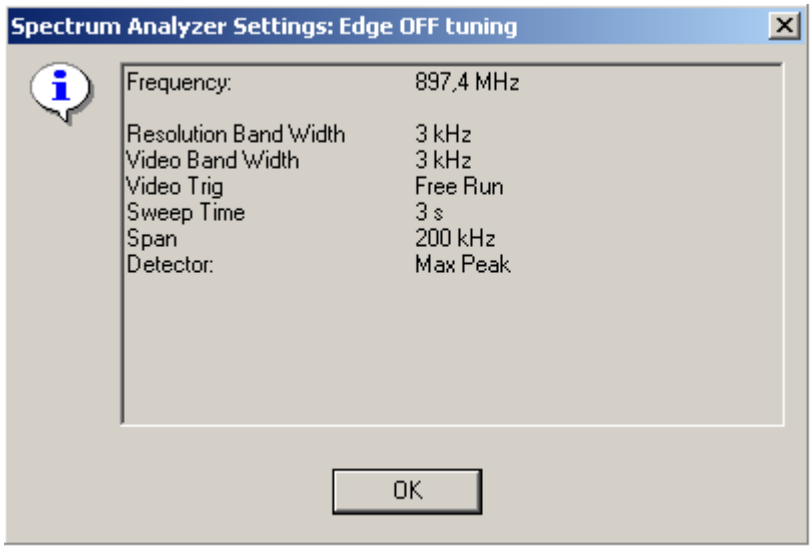
Set up spectrum analyzer accordingly.

Remember to take the jig and cable attenuations into account!



The coefficient table lists the power level, coefficient and target dBm for each power level.

The tuned power level can be chosen by using up and down arrows or mouse.

The current power level is shown with inverse colors.

The tuning value can be adjusted with "-" and "+" keys.

Use only High-mode (TxPA mode).

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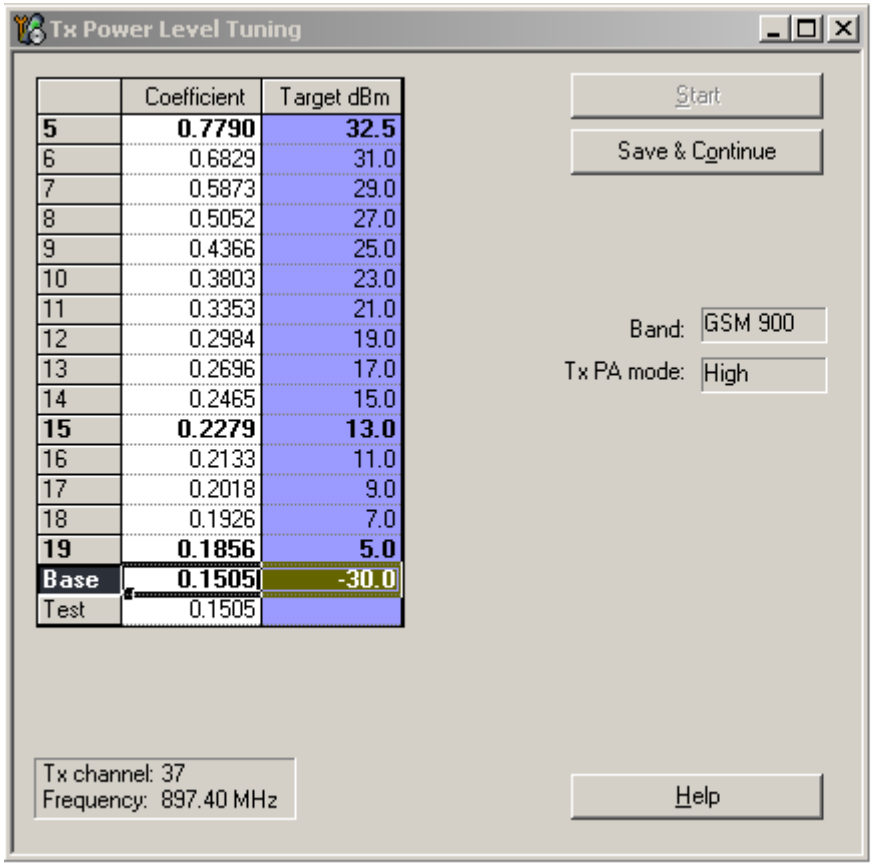
Tune Base level and power levels 19, 15 and 5 to target level.

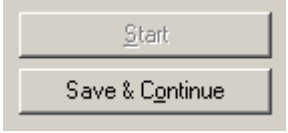


Press “Save and continue”.

Typical values: GSM900

Power level	Coefficient
5	0.670...0.850
15	0.210...0.240
19	0.170...0.200
Base	0.140...0.170

Press “Save & Continue”. Tuning values will be calculated and saved to phone’s memory.



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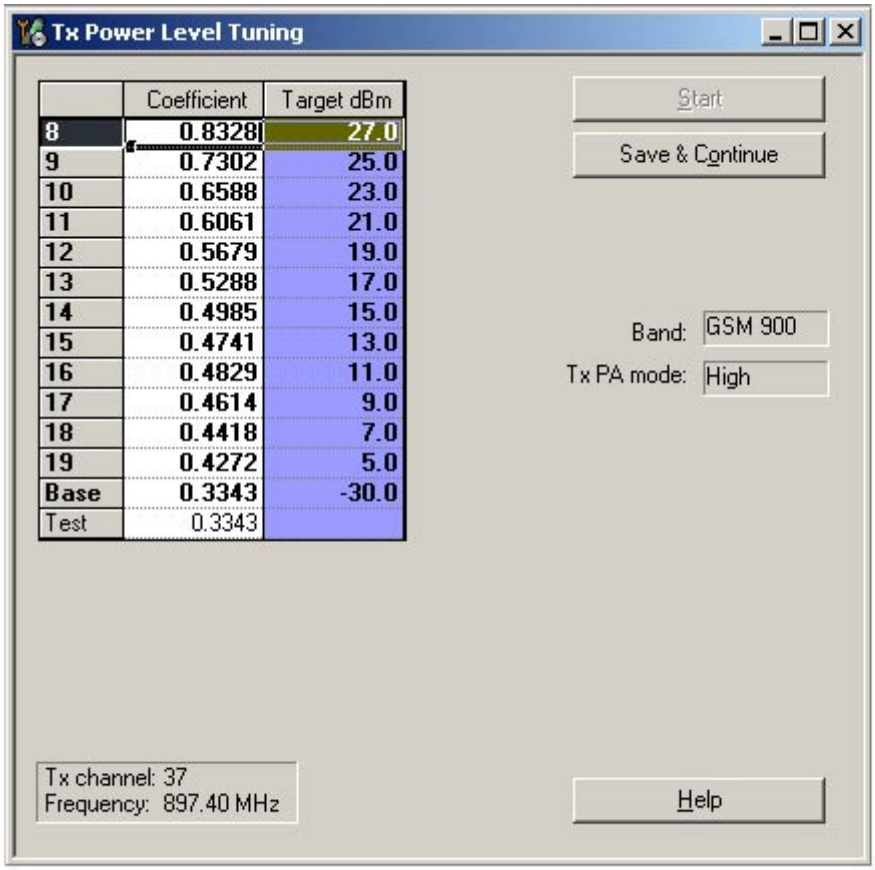
Tuning continues at EDGE900.

Set up spectrum analyzer accordingly.

Press "OK" and start tuning.



Tune all power levels to target level. Use only High-mode (TxPA mode).

Note! Target for EDGE Base level is -15dBm.

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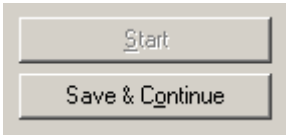
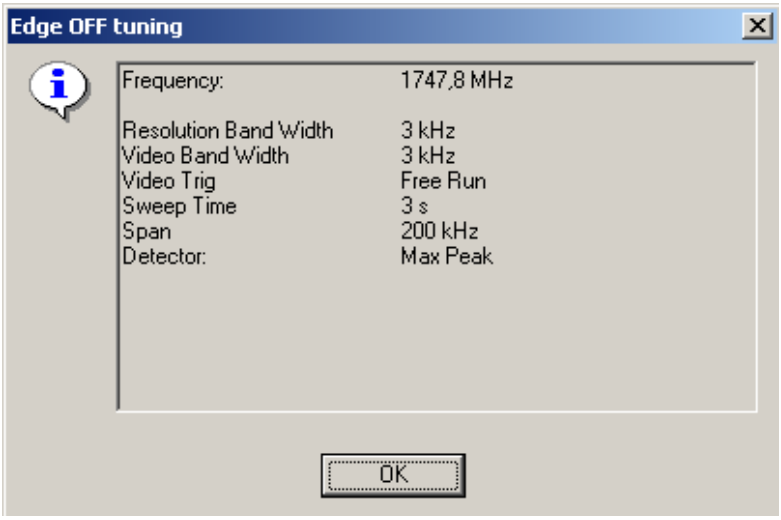
Press "Save & Continue" to save the tuning values to phone's memory.



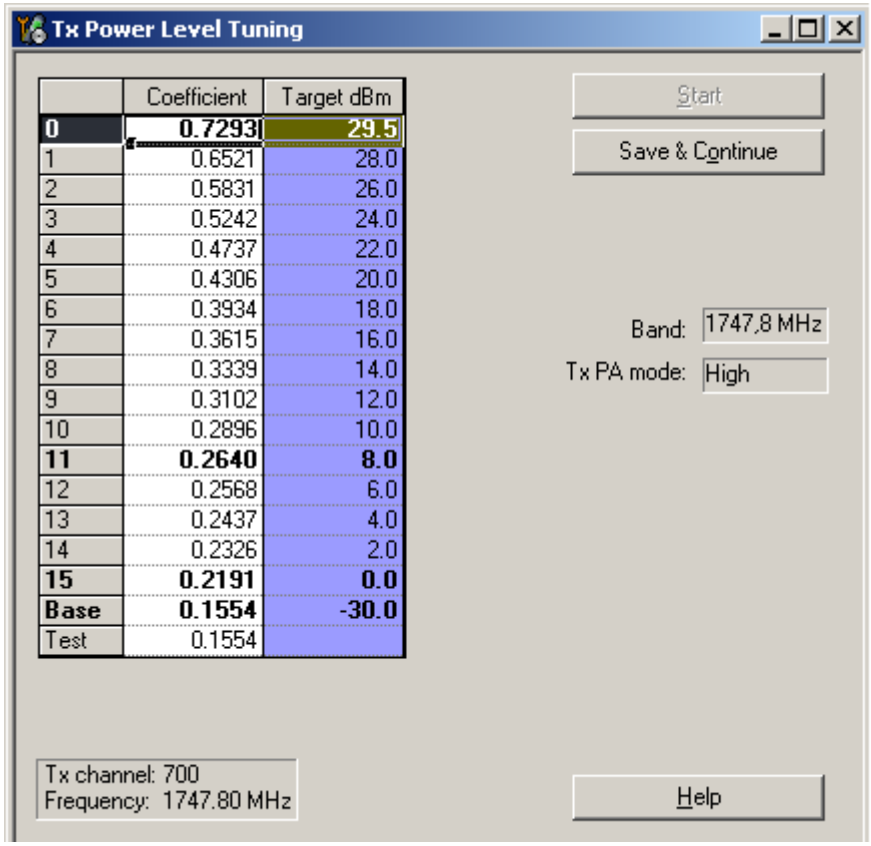
Continue tuning at GSM1800 band

Set up spectrum analyzer accordingly.

Remember to take the jig and cable attenuations into account!



Press "OK" and start tuning.



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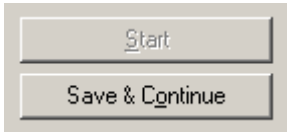
Tune Base level and power levels 15,11 and 0 to target level.

Typical values: GSM1800

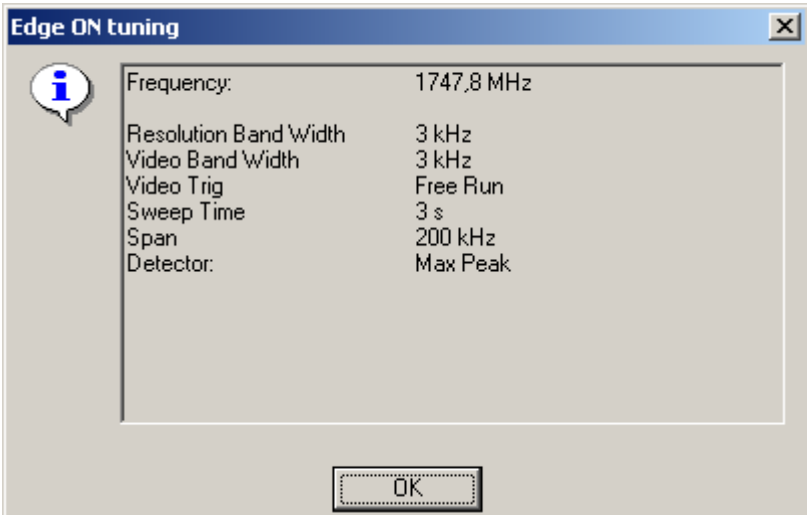
Power level	Coefficient
0	0.580...0.700
11	0.210...0.240
15	0.180...0.210
Base	0.135...0.165

Press "Save & Continue". Tuning values will be calculated and saved to phone's memory.



Tuning continues at EDGE1800.

Set up spectrum analyzer accordingly.



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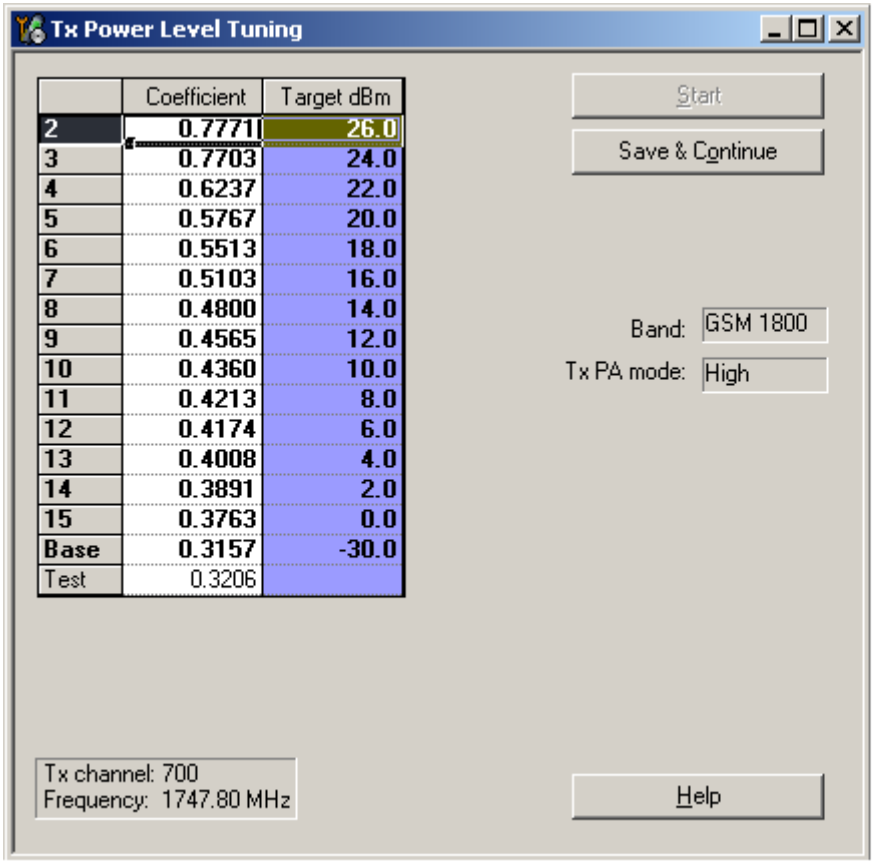
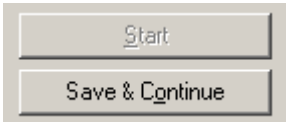
Press "OK" and start tuning.



Tune all power levels to target level.

Note! Target for EDGE Base level is -15dBm.

Press "Save & Continue" to save the tuning values to phone's memory.



Continue tuning at GSM1900 band

Set up spectrum analyzer accordingly.

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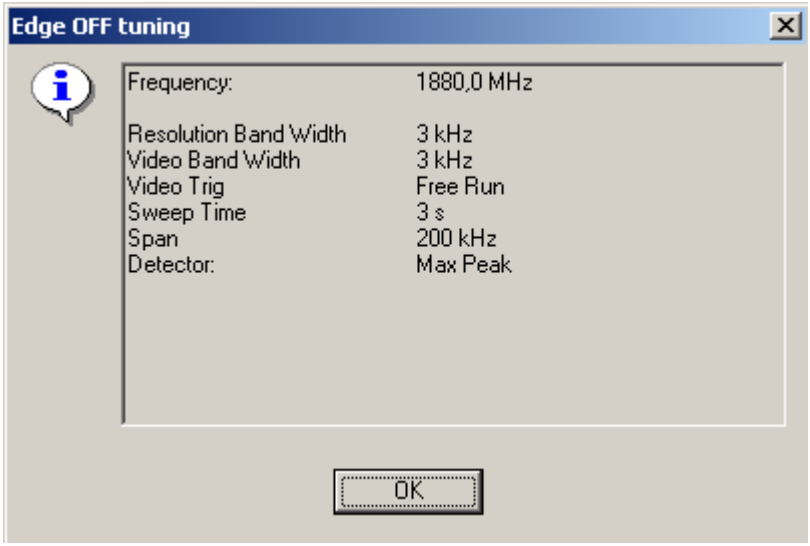
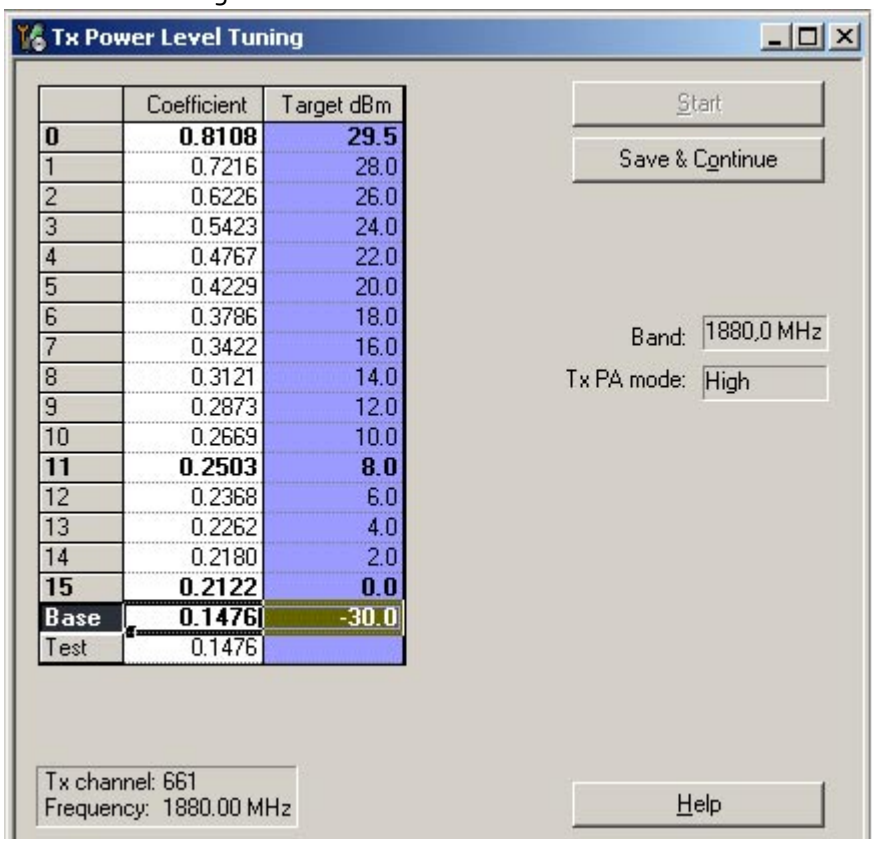
Remember to take the jig and cable attenuations into account!



Press "OK" and start tuning.



Tune Base level and power levels 15, 11 and 0 to target level.

Typical values: GSM1900

Power level	Coefficient
0	0.580...0.700

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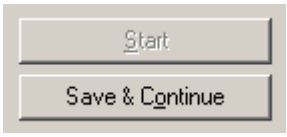
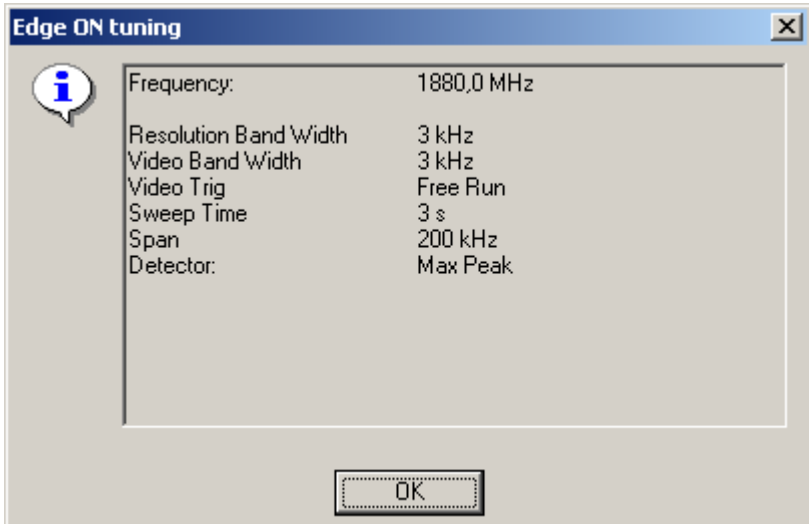
Power level	Coefficient
11	0.210...0.240
15	0.180...0.210
Base	0.150...0.165

Press "Save & Continue". Tuning values will be calculated and saved to phone's memory



Tuning continues at EDGE1900.

Set up spectrum analyzer accordingly.



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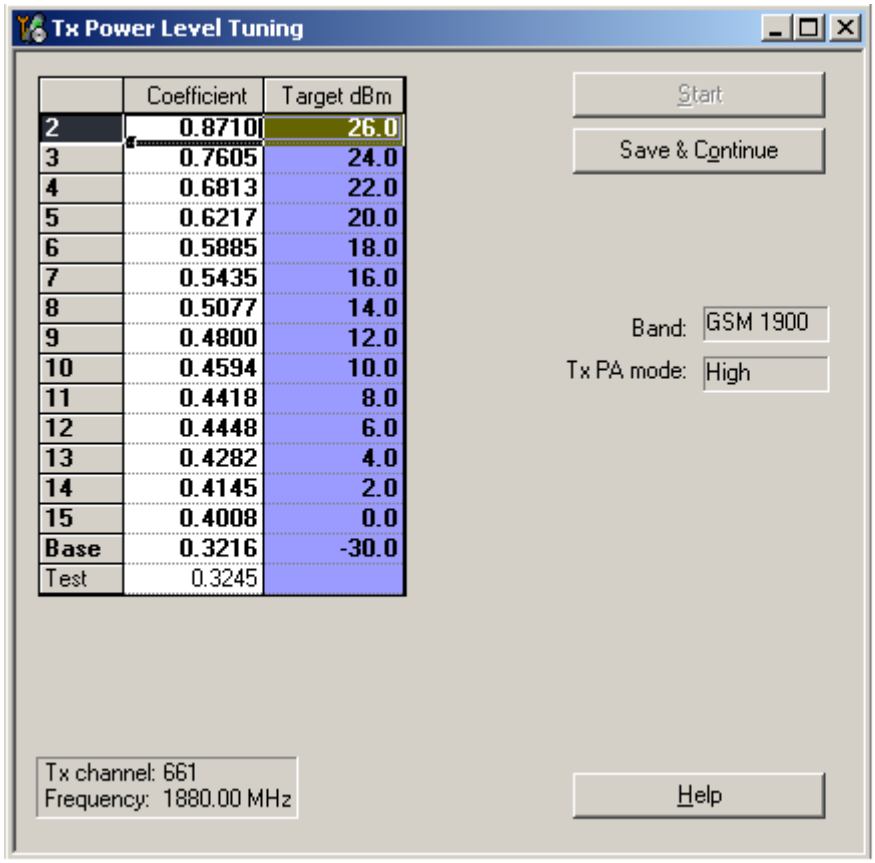
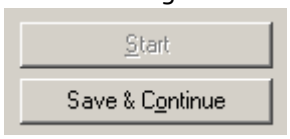
Press "OK" and start tuning.



Tune all power levels to target level.

Note! Target for EDGE Base level is -15dBm.

Press "Save & Continue" to save the tuning values to phone's memory.



TX Power Level Tuning is now completed.

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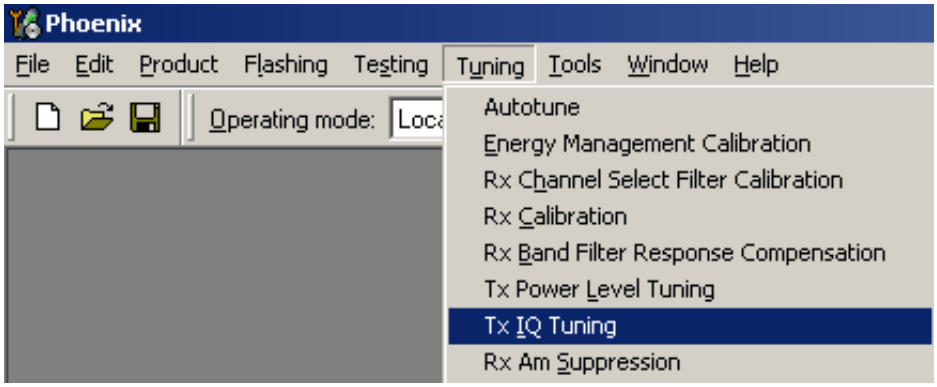
TX I/Q Tuning

Spectrum analyzer needed.

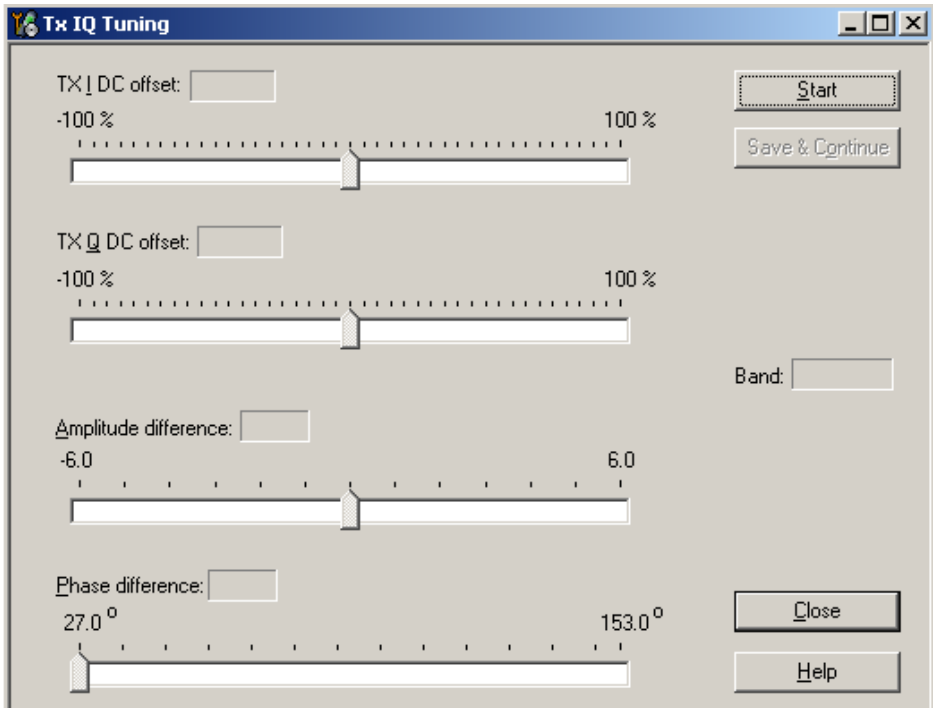
Tx IQ Tuning allows changing the Tx I DC Offset, Tx Q DC Offset, Amplitude difference and Phase difference.

Must be done separately on all bands!

Select Tuning => Tx_IQTuning



Tx IQ Tuning window will open.



Press "Start" and tuning will begin at GSM900 band.

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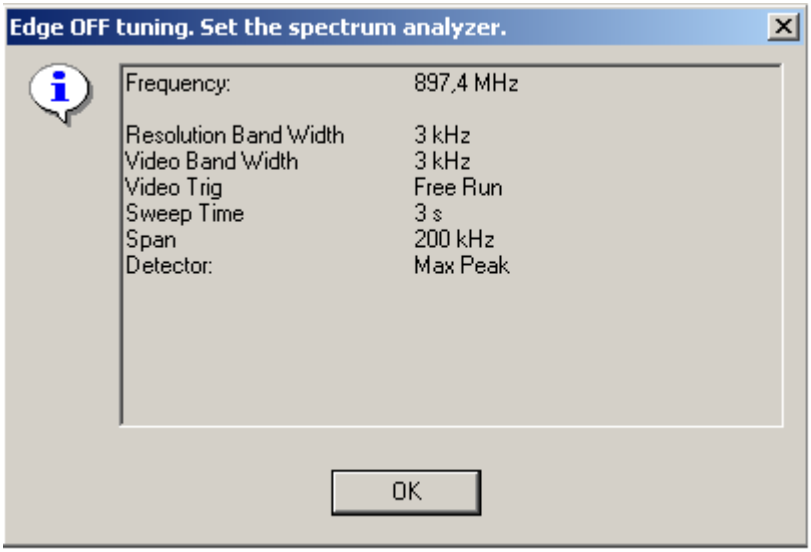
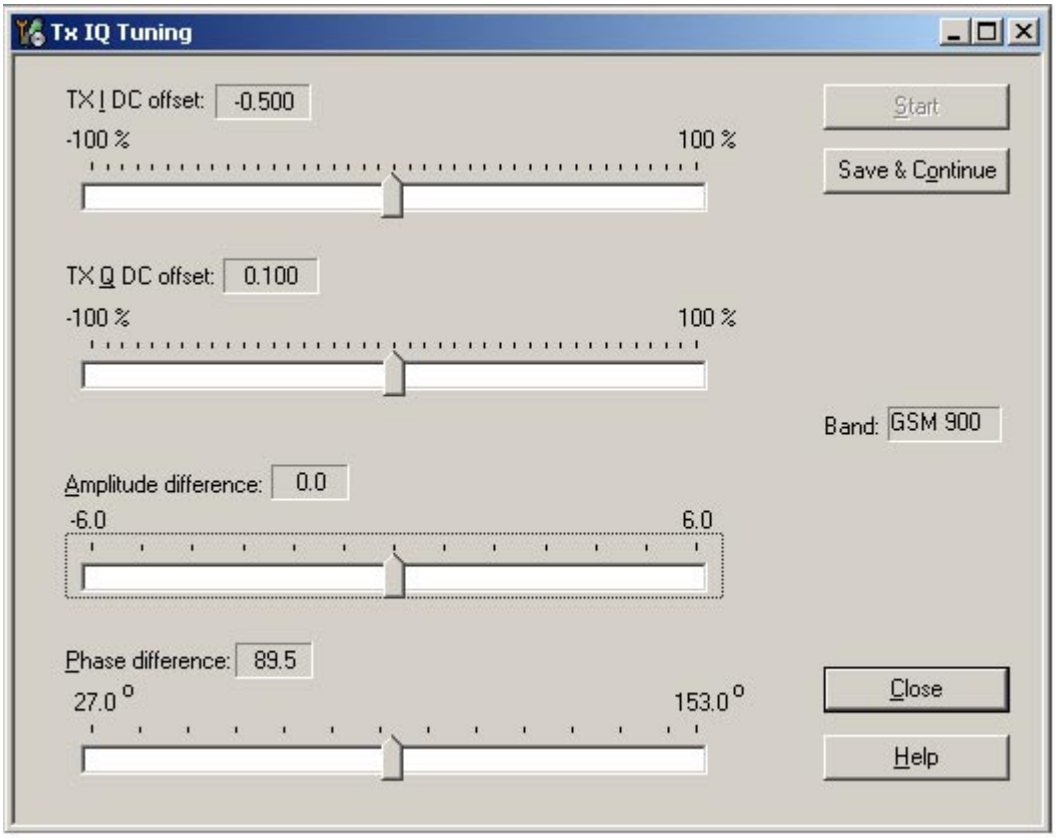
Adjust spectrum analyzer accordingly.



Press "OK" and start tuning.



Tuning is done by setting each of the sliders to desired value.

The order of tuning should be the same as the order of the sliders, that is, the Tx I DC Offset is tuned first and Phase difference is tuned last.

Use <= , =>, PgUp or PgDn keys.

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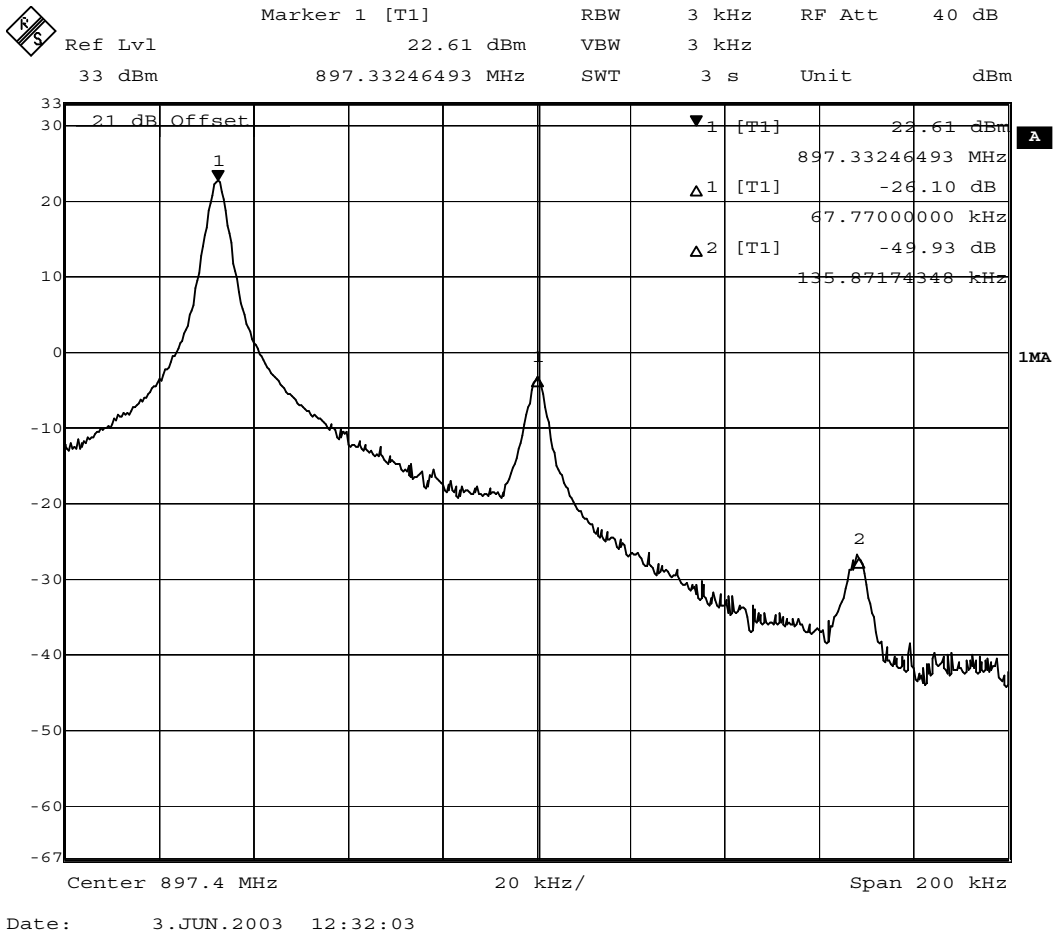
Tune LO leakage to minimum with TXI/TXQ DC Offset control (f0 on spectrum analyzer screen).

Tune unwanted sideband to minimum using Amplitude/Phase difference controls (f0 + 67.71kHz on spectrum analyzer screen).



Tuning limits are the same for all bands (GSM/EDGE900, GSM/EDGE1800 and GSM/EDGE1900):

Tuning limits:	
I DC Offset	-6...+6
Q DC Offset	-6...+6
Amplitude difference	-1...+1
Phase difference	- 80°…100°

When the IQ spectrum is balanced, "Save & Continue" to EDGE900 TX IQ tuning.

Spectrum analyzer settings are the same as for GSM900 IQ tuning.

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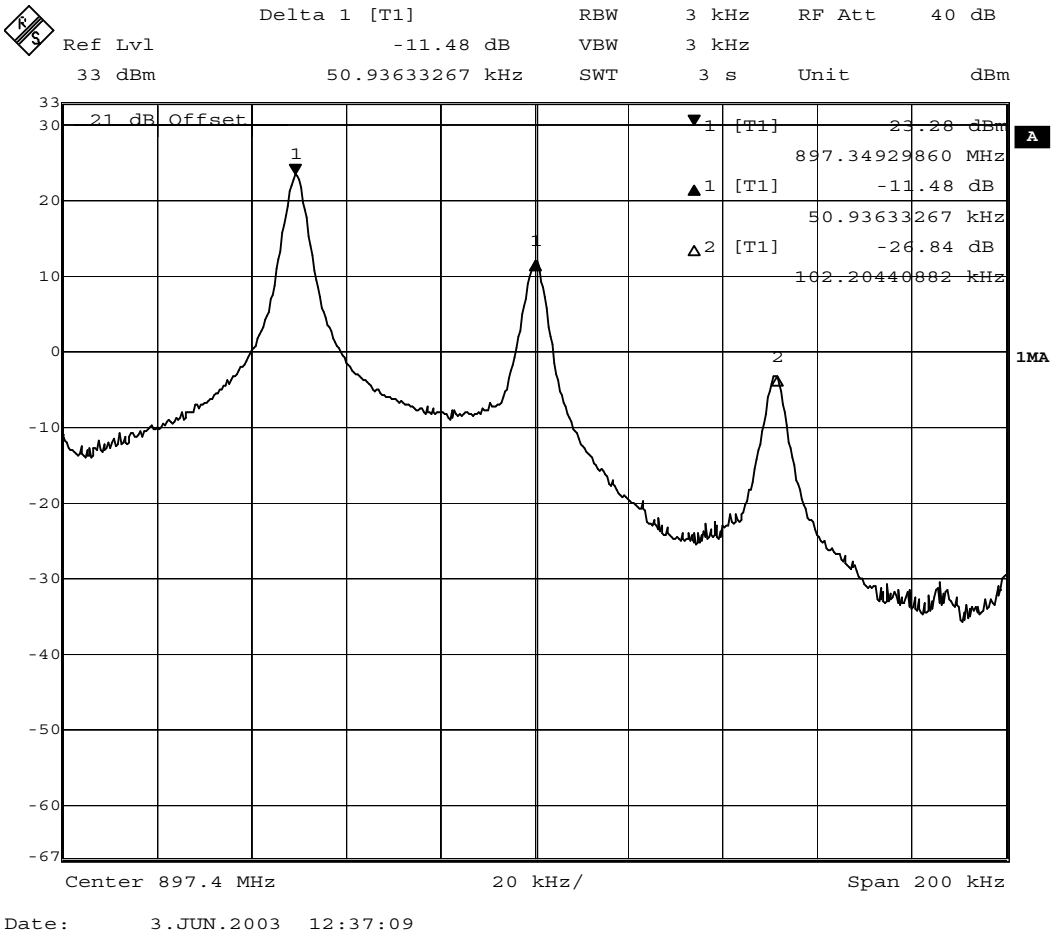
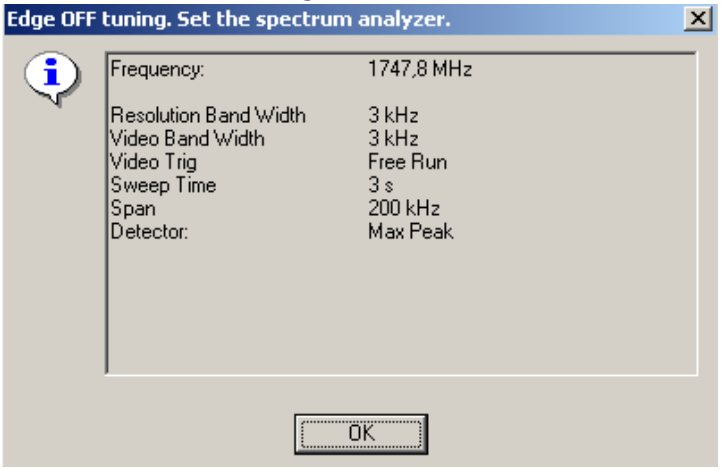
NOTE! In EDGE-mode, the unwanted sideband is located at 50.8kHz from f0.



When the IQ spectrum is balanced, press "Save & Continue".

Continue tuning at GSM/EDGE1800 band

Adjust spectrum analyzer accordingly.



Both GSM and EDGE 1800 use the same settings.

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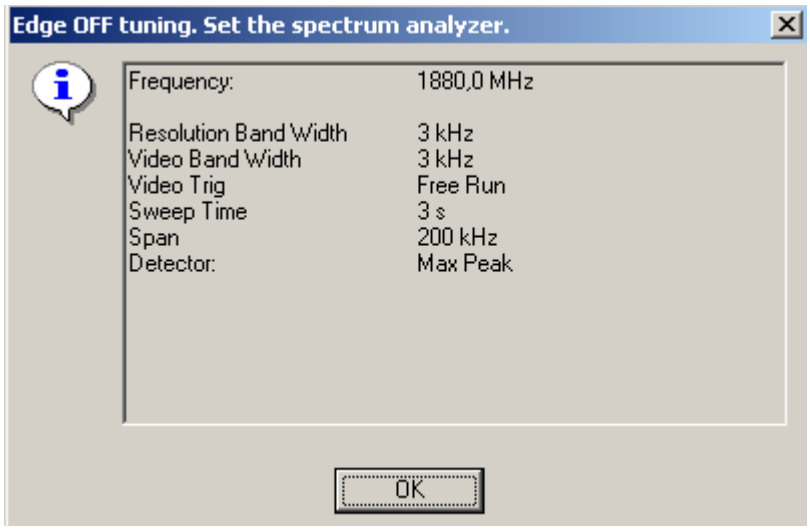
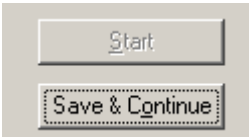
Continue tuning at GSM/EDGE1900 band

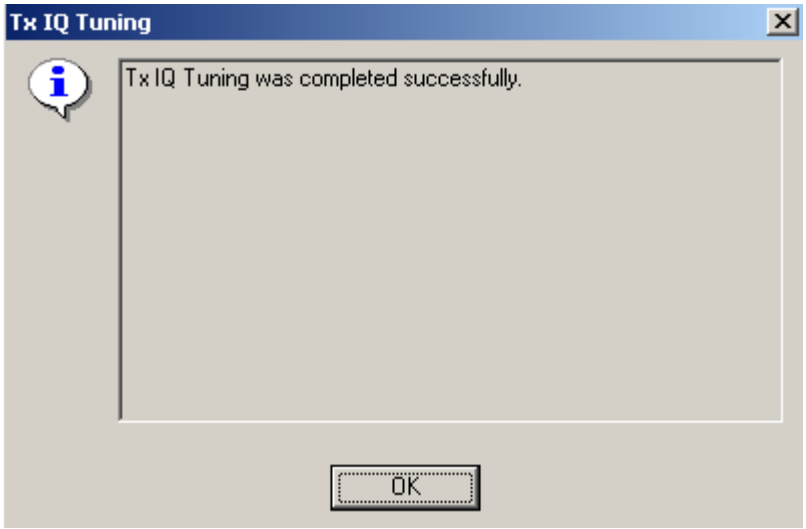
Adjust spectrum analyzer accordingly.



Both GSM and EDGE 1900 use the same settings.

When GSM and EDGE 1900 are tuned, press "Save & Continue".





Press "OK" and the TX IQ Tuning is completed.

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Service Tool Concept For Baseband Tuning Operations

EM calibrations should be carried out in JBV-1 Docking Station equipped with DA-19 Docking Station Adapter.

Note: RF tunings must be carried out in MJS-38 module jig, JBV-1.

Power to JBV-1 should be supplied from an external DC power supply, not FPS-8 prommer.

JBV-1 input voltages:

Maximum +16 VDC

Nominal input for RF tunings is +12 V DC.

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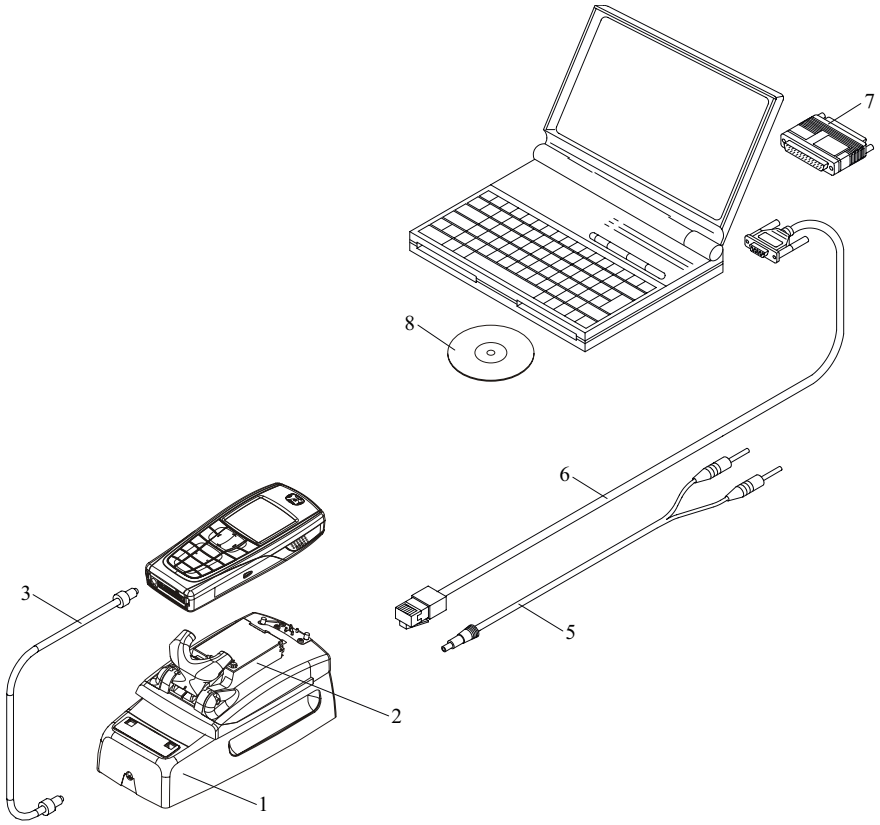
Service Concept for RH-20* Baseband tunings



Item	Accessory type	Service Accessory	Product code
1	JBV-1	Docking Station	0770298
2	DA-19	Docking Station adapter	0770674
3	SCB-3	DC-DC Cable	0730114
5	PCS-1	DC power cable	0730012
6	DAU-9S	Service FBUS cable	0730108
7	PKD-1	Software protection key	0750018
8	Service SW	CD-ROM	

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Baseband Tuning operations

Energy Management Tuning

External power supply needed.

Energy Management (EM) Calibration is used for calibrating Battery and Charger settings of the phone.

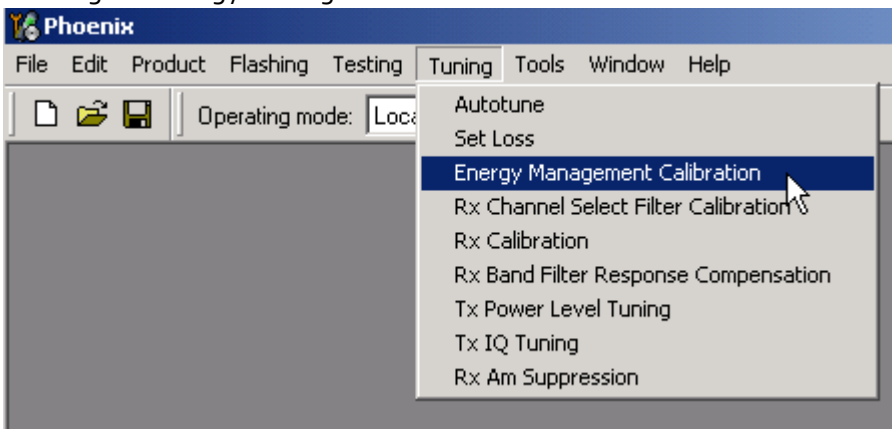
Preparation for EM Calibration:

- Connect the DC Cable SCB-3 between JBV-1 and Vin of the Phone for Charger calibration.

- Connect 12...15 V from the Power Supply to JBV-1.

- NOTE! Check that the connection is F-BUS (does not work with M-BUS).

Select Tuning => Energy Management Calibration.



Energy Management values to be calibrated are checked.

Select "Read from Phone" to show the current values in the phone memory and to check that the communication with the phone works.

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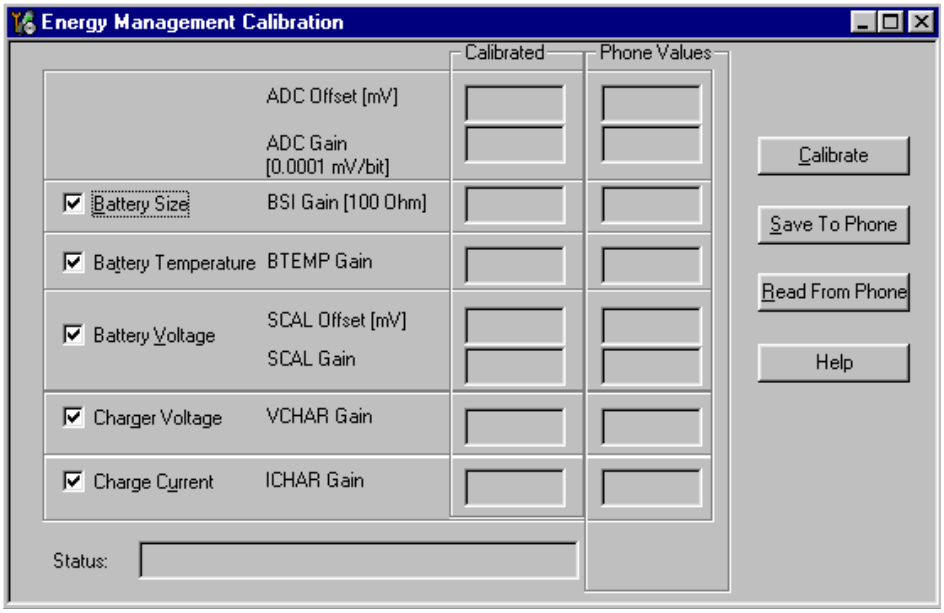
Select "Calibrate" to run the selected calibrations.



Limits for Energy Management Calibration:

Parameter	Min.	Max	Note
ADC gain	25400	29000	VBatt, BSI, BTemp
DC offset	-50	50	ADC voltage offset
BSI gain	970	1100	ADC BSI calibration gain
BTEMP gain	2075	2275	ADC BTEMP calibration gain
VBAT gain	10000	11000	ADC VBATT Voltage gain
VBAT offset	2300	2900	ADC VBATT Voltage offset scale
VCHAR	58000	62000	Charge voltage
ICHAR	4050	4800	charge current

If values shown are within limits select "Save To Phone" to save the values in the phone.

NOTE! Only the values of the checked tunings (Battery size, Battery Temperature etc...) are saved.

Close the "Energy Management Calibration" – dialog to end tuning.

You must manually switch the phone on after exiting "Energy Management Calibration" – dialog.

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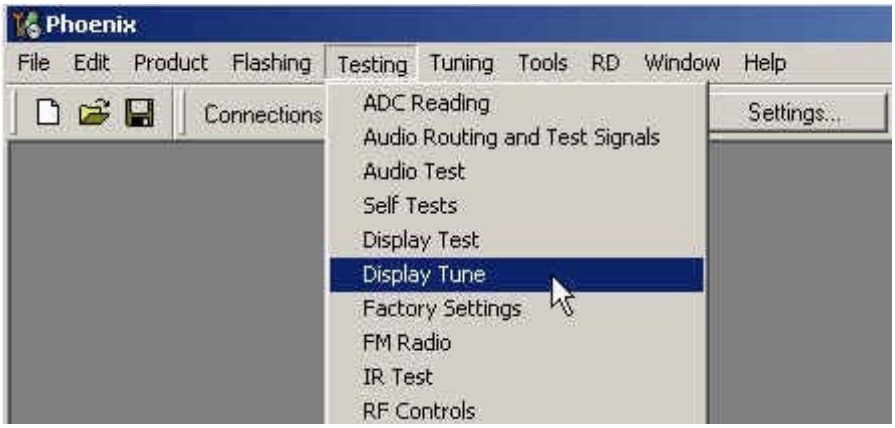
LCD Contrast Tuning

Extra equipment not needed.

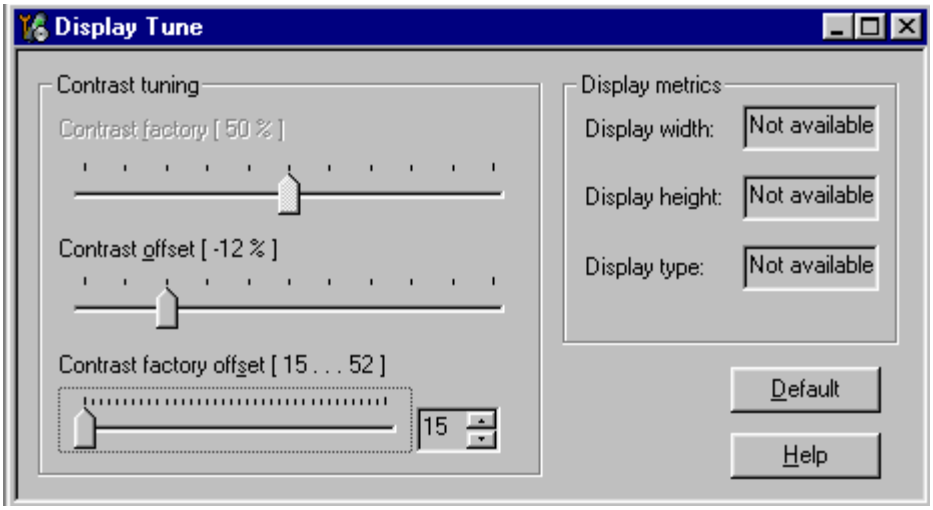
This function is used to calibrate the LCD Contrast.

Must be done when LCD module is changed and there is considerable difference in the contrast.

Select Testing => Display Tune



Move the sliders to reach good LCD contrast.



Close the "Display tune" dialog to end tuning.

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Flashing Setup Instructions

POS (Point of Sale) Flash Concept

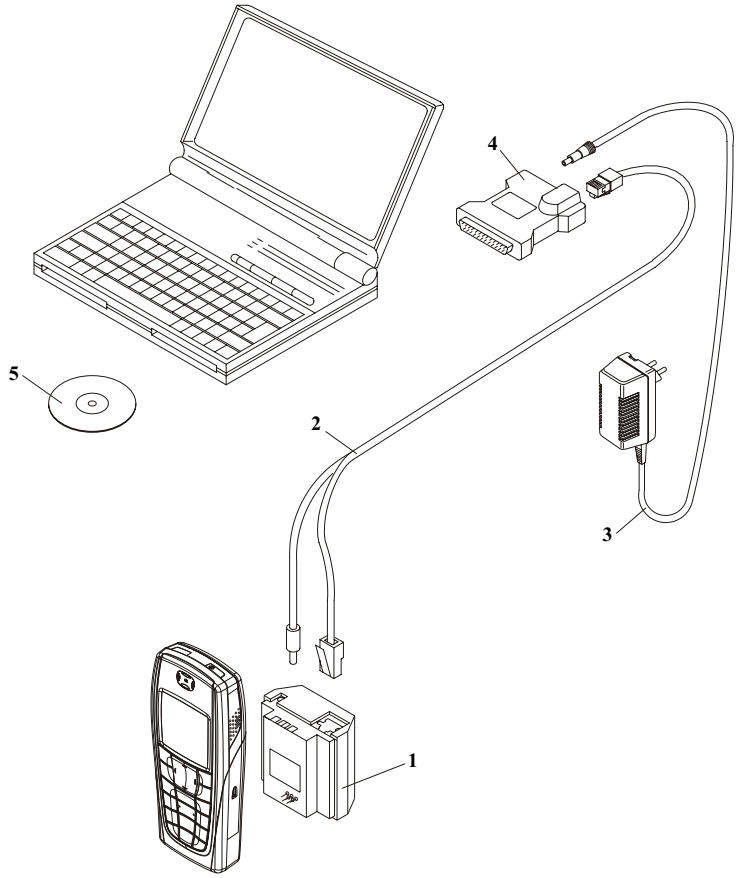

Figure 1: POS flash

Item	Type	Description	Code
1	FLA-27	Point Of sales flash loading adapter	0770492
2	XCS-1	Service cable	0730218
3	ACF-8	AC Charger	0680032
4	FLS-4S	FLS-4S sales package E&A	0080541
	FLS-4S,	FLS-4S sales package APAC	0080542
	FLS-4S,	FLS-4S sales package US	0080543
5		Service SW CD-ROM	

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Flash Concept with Flashing adapter

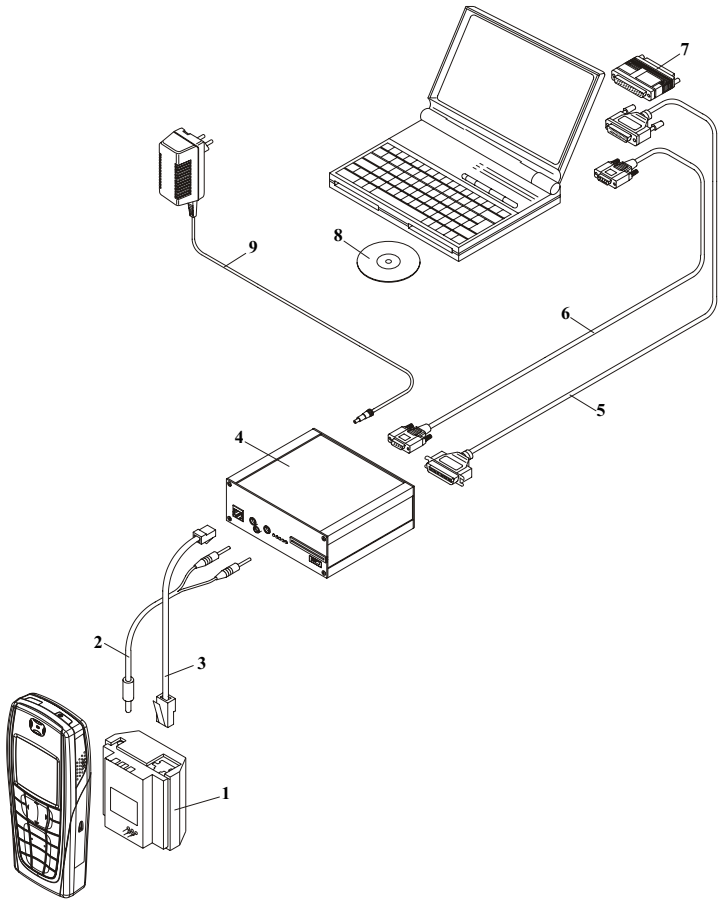

Figure 2: Flash comcept with flashing adapter

Item	Type	Description	Code
1	FLA-27	Point of sales flash loading adapter	0770326
2	FLC-2	Power cable, incl in FLA-27 sales package	0730185
3	XCS-4	Modular cable	0730178
4	FPS-8	Flash prommer box **with 2x SF12 SRAM**	0080321 and 0080346
5		Centronics (printer) cable, incl in FPS-8 sales package	0730029
6	AXS-4	RS-232 (D9-D9) cable, incl in FPS-8 sales package	0730090
7	PKD-1	Software protection key	0750018
8		Service SW CD-ROM	
9	ACF-8	AC charger, incl in FPS-8 sales package	0680032

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Module Jig Concept

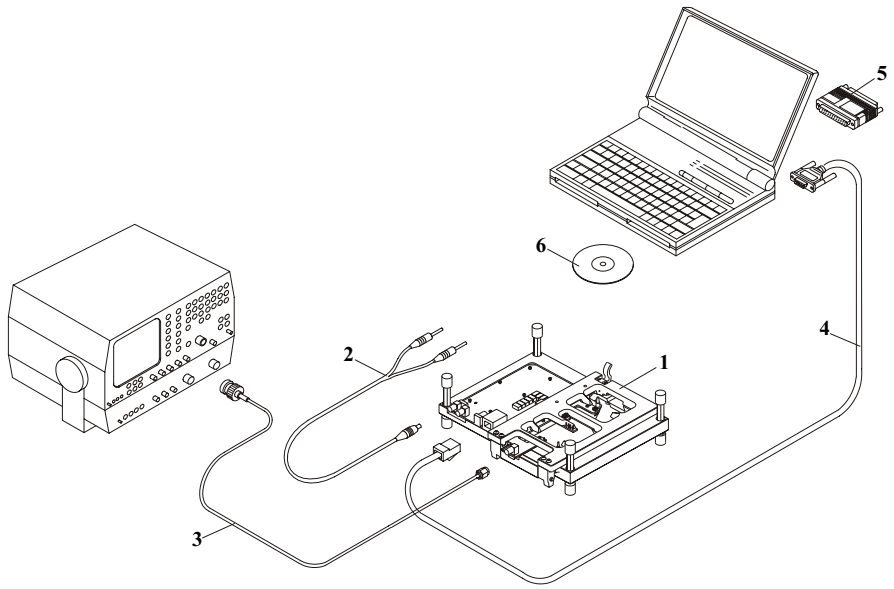

Figure 3: Module jig concept

Item	Type	Description	Code
1	MJS-38	Module jig	0770416
2	PCS-1	DC power cable	0730012
3	XRF-1	RF antenna cable	0730085
4	DAU-9S	Service FBUS cable	0730108
5	PKD-1	Software protection key	0750018
6		Service SW CD-ROM	

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JBV-1 Flash Concept

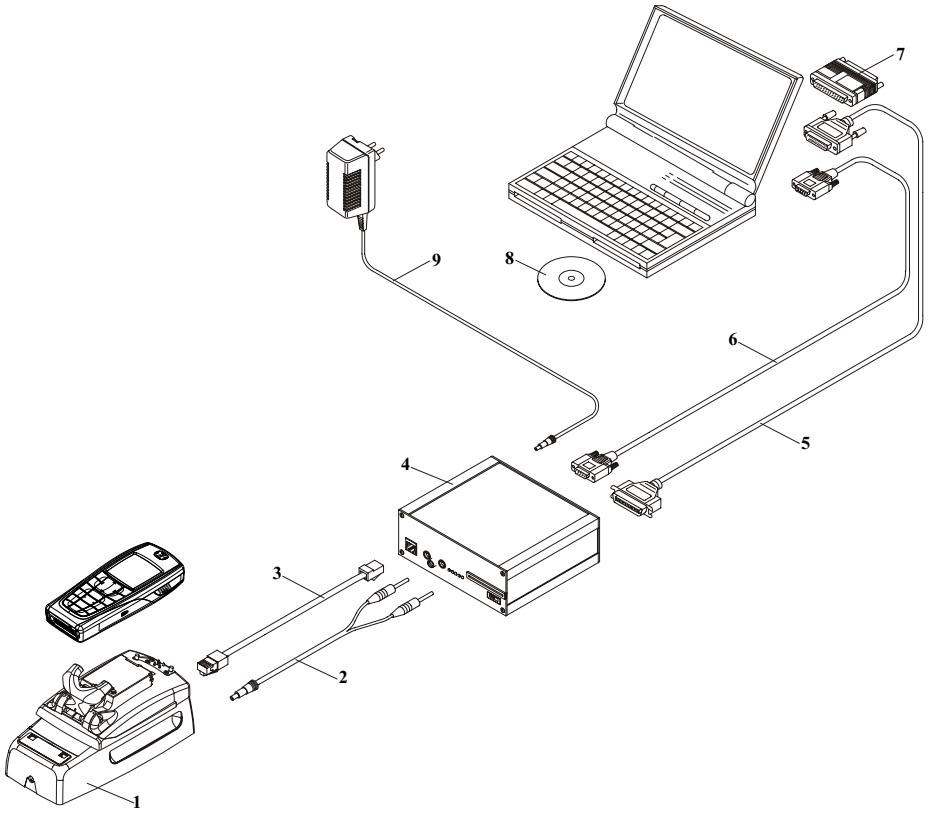

Figure 4: JBV-1 Flash concept

Item	Type	Description	Code
1	JBV-1	Docking station	0770298
2	PCS-1	DC power cable	0730012
3	XCS-4	Modular cable	0730178
4	FPS-8	Flash prommer box	0080321
5	Printer cable	Incl. in FPS-8 sales pack	0730029
6	AXS-4	D9 – D9 cable, incl. in FPS-8 sales pack	0730090
7	PKD-1	Software protection key	0750018
8		Service SW CD-ROM	
9	ACF-8	AC Charger, incl. in FPS-8 sales pack	0680032

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Service Concept

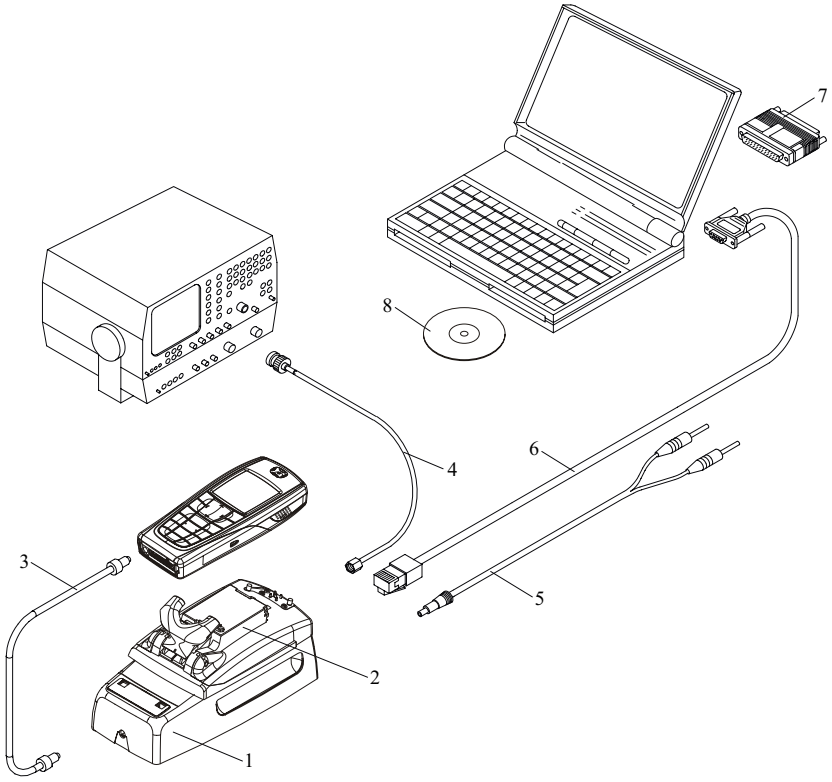

Figure 5: Service Concept

Item:	Service accessory:	Type:	Product code:
1	Docking station	JBV-1	0770298
2	Docking station adapter	DA-13	0770613
3	DC-DC cable	SCB-3	0730114
4	RF antenna cable	XRF-1	0730085
5	DC power cable	PCS-1	0730012
6	Service FBUS cable	DAU-9S	0730108
7	Software protection key	PKD-1	0750018
8	Service SW CD-ROM		

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Parallel Flash concept

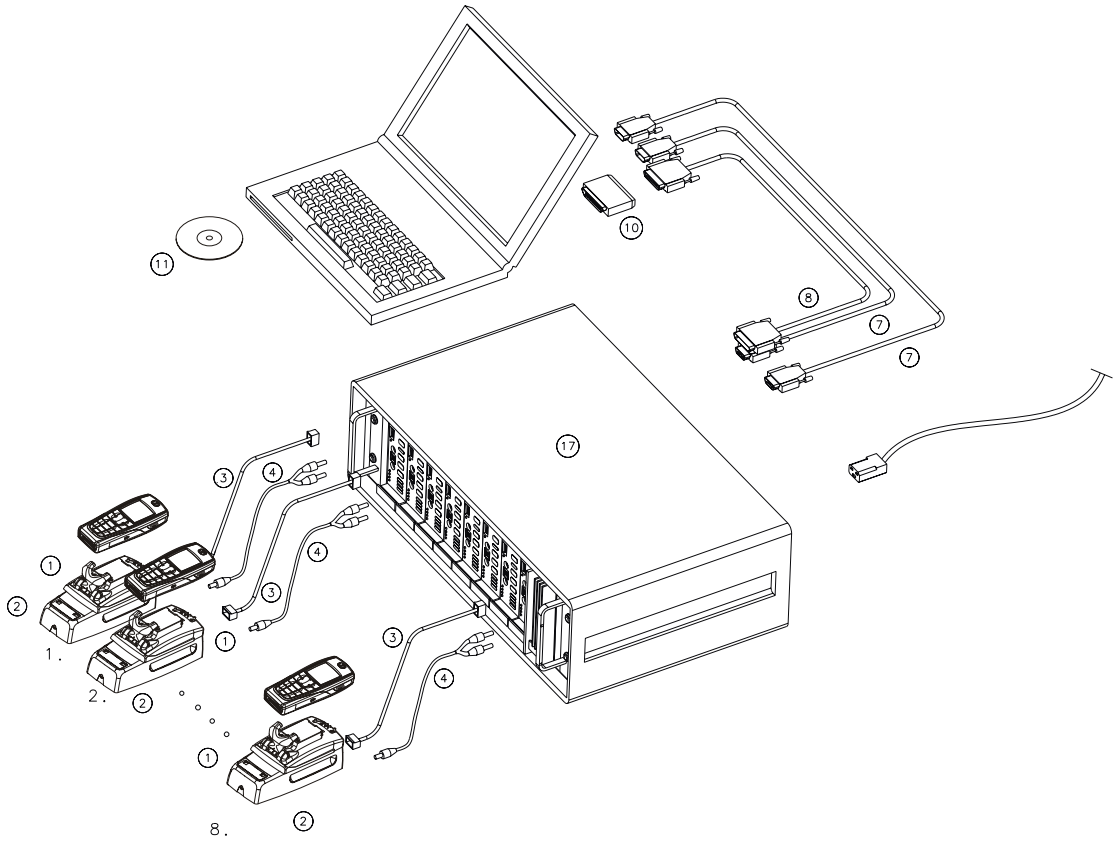

Figure 6: Parallel flash concept

Item	Type	Description	Code
1	DA-19	Docking station adapter	0770674
2	JBV-1	Docking station	0770298
3	XCS-4	Modular cable	0730178
4	PCS-1	DC power cable	0730012
7	AXS-4	D9 – D9 cable, incl. in FPS-8C sales pack	0730090
8	Printer cable	Incl. in FPS-8C sales pack	0730029
10	PKD-1	Software protection key	0750018
11		Software (PC SW + SF11C SW)	
17	FPS-8C		0080396

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